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# PHYSICIANS WHO CARE FOR END-STAGE RENAL DISEASE PATIENTS: A NATIONAL STUDY OF THEIR PRACTICES, PATIENTS AND PATIENT CARE

Final Report

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# ABSTRACT

The University of Southern California, Division of Research in Medical Education, has conducted a nationwide survey of the professional activities of physicians who provide care for patients with end-stage renal disease. The survey, based on a target population of physicians affiliated with dialysis facilities, achieved a 65.2% response rate and included 336 respondents. Each respondent provided data on workload, allocation of time to various professional activities, and information of each patient treated during an assigned study period, as well as data on characteristics of the practice. The survey, conducted during October of 1982, yielded a study population that was far different from the general population of nephrologists, with more office-based and board certified physicians. Data from the survey show that ESRD physicians' workloads parallel the busy practices of generalist physicians more than they do the practice patterns of most subspecialists in initial medicine (except that the outpatient load occurs mainly in the dialysis unit). Patient encounter data show that the majority of their visits are with ESRD patients, and that over half of all ESRD patients (facility and self care combined) are seen once a week or more. ESRD physicians report seeing facility hemodialysis patients an average of between 1.6 and 1.7 times a week. The telephone is used primarily for communicating with other health professionals, and calls with patients are primarily with non-ESRD patients. There are pronounced differences in the morbidity profiles of patients on different types of dialysis; home hemodialysis patients were found to have low rates of serious systemic illnesses, whereas peritoneal dialysis patients have high rates of diabetes mellitus. IPD patients are the sickest patients on a number of criteria, but there is little evidence to indicate that patients treated in hospital-based hemodialysis centers are any sicker than those in freestanding facilities. Finally, physicians with the highest workloads provide less resource-intensive care (less time spent with the patient and fewer diagnostic tests employed) even when medical complications and other sources of variation in care are controlled for statistically.

# ACKNOWLEDGEMENTS

This study would not have been possible without the availability of several individuals who worked with the Principal Investigator over a seven-year time period and who were available and interested. Particularly noteworthy are Stephen Radecki whose research and management skills were applied to all aspects of the study; Richard Neville whose system programming knowledge and relevant experience from comparable surveys allowed a smooth transition to this one; Roger Girard whose advice was most welcome in the formulation of databases and in survey redesign; Barbara McMillan for database design and preparation; Andrew Bliss whose skills in various systems of diagnosis coding were aptly applied to this one; Ray Hardesty who was an editor and processor, and Cathy Wood-Siverio who served both as a technical assistant and data organizer.

Our physician friends from prior studies gave valuable advice in study design and in the strategy for actually carrying the study forward. Particularly we wish to acknowledge Robert H. Moser, Executive Director of the American College of Physicians; Harry N. Beaty of the Association of Professors of Medicine, and Roscoe R. Robinson, President of the American Society of Nephrology. The entire APM Task Force on Manpower was quite helpful in the early conceptual stages, stimulated in part by Alvin R. Tarlov.

The work of the various renal disease networks in actually obtaining the sample of physicians for this study was a major effort for all concerned. Under the direction of Charlene Brax, Executive Director of Network 4 for the Southern California area, and with the endorsement of Dominick E. Gentile, Chairman of the Forum of End-Stage Renal Disease Networks, the networks polled the selected centers within their areas and obtained the necessary classification data. Undoubtedly, much of the quality that is associated with this key study phase is due to their efforts.

The network of physicians who acted as our representatives in contacting the sample of renal physicians to encourage their participation was formed under the direction of Richard B. Freeman, President of the Renal Physicians Association. Each of these individuals did all that was asked and more. We are grateful to them.

The Renal physicians who served as the study's research advisors are Christopher R. Blagg, John P. Capelli, Eben I. Feinstein, Richard B. Freeman, Dominick E. Gentile, and Allen R. Nissenson. These advisors devoted a great deal of work to all phases of the study, from the design of the study instrument to the interpretation of the resulting data.

Our government advisors helped as we needed help and allowed us the type of freedom that investigators desire. Peter McMenamin saw the study through its inception and most of its critical periods. Benson Dutton guided it through its final stages.

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Robert C. Mendenhall
Principal Investigator

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# PHYSICIANS WHO CARE FOR END-STAGE RENAL DISEASE PATIENTS: A NATIONAL STUDY OF THEIR PRACTICES, PATIENTS AND PATIENT CARE

## INTRODUCTION

Under a grant from the Department of Health and Human Services (DHHS), Health Care Financing Administration (HCFA), the University of Southern California School of Medicine's (USC) Division of Research in Medical Education (DRME) has completed the data collection, data processing and initial statistical analyses of data from a national study of physicians and physician-practices where end-stage renal disease care is the dominant type of care provided. Specifically, this study was expressly designed to obtain factual data about the patient population, the physician and the physician's practice, the problems seen by (and treated by) physicians, and the case-mix differences in patient care. There are many reasons for a study such as the one just completed; the most obvious one is that a carefully conceptualized and designed study of the salient facets of a physician's practice will yield insights into "practice content" that are not otherwise obtainable. We know, from past national studies of physician practices, that there is a substantive difference in what they actually do as compared to what they will estimate they do when asked for retrospective assessments. Furthermore, if the design of the survey protocol is expressly addressed to all possible types of patient-care situations, then its potential for inferences about practices is substantially enhanced. The study reported on here builds directly upon a survey protocol developed by the USC/DRME group over a period of years and used in a series of 24 national-scope specialty studies.[1-4] An instructive analysis is implicit in the data contained in this survey's database and that which is contained in the nephrology specialty study database collected five years previously.[5] Such a comparative analysis must await a secondary analysis stage; at this time, we will report only on the baseline "structural" statistics with some limited correlational analyses as we focus attention on the selected parameters of care and on important contributors to differential levels of complexity of care. As we proceed through this major compilation of statistics, we should find the data suggesting other statistics that might illuminate an obscurity or, possibly, corroborate a finding. Surely, such insights are as much a part of the analysis phase as the simple statement of the scope of a particular statistical conclusion.

It was our intention to obtain very detailed information on the demography of the patient, the patient's problem(s) and the time-frame within which the patient has been treated by this physician. With the data provided, we can focus more narrowly on multiple facets of care; the fact that we are selective in our initial report in no way documents the possible scope of analyses which the database permits. What the data as organized here do show are the most important structural features of the patient and patient-provider networks--including the kinds of demographic and operational variables that are needed for other, more intensive levels of inferential analyses.

The central purpose of this study was to illuminate the operant and clinical aspects of end-stage renal disease care and to do so on a large-scale basis, i.e., in sufficient breadth and depth to permit statistically sound conclusions at the national, regional and, in some instances, dichotomized population-based level. We believe that we have met (and in some cases exceeded) our central objectives. The sections to follow will permit the reader's evaluation of this assumption.

Physicians were selected for potential participation in this study through a two-stage survey process. The first entailed selecting a random sample of ESRD treatment centers from a master list of such facilities provided to USC/DRME by HCFA. The "universe" for the study was defined by HCFA as encompassing dialysis facilities that were being reimbursed for dialysis treatment under the "alternate" (capitation-based) plan. As described in a technical report that documents the study's sampling design and provides detailed data on regional differences in responses to the first stage of the survey,[6] 300 such facilities were randomly selected for inclusion in the study. Of these, 8 were subsequently found to be ineligible for the study; 267 of the remaining 292 facilities completed and returned a "Physician Enumeration Form" (see Appendix) for a response rate of 91.4%.

The 267 facilities that completed and returned the form produced a total of 1,116 names (an average of 4.2 per facility). After dropping 190 duplicate names, a 60% random sample was drawn of the remaining 926 "unique" names, producing a survey sample of 554. The final sample size exceeded the "target" sample size of 500* by approximately 11%

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*Based on results from USC's 1977 nephrology study,[5] it was determined that a sample of 480 renal physicians would be required in order to ensure that the number of physicians in any major demographic category did not fall below the minimum of 30 required for the use of common inferential statistical techniques, assuming a response rate of 60%. This determination was then used to set a target sample size of 500.

in order to allow for physicians who had been incorrectly listed on the enumeration forms, or who were otherwise ineligible for the study.

Physician Participation in the Study

Complex studies of physician practices require more than the usual diligent attention of non-physician researchers. We have found that very high interest is kindled where a network of physician-peers exists and where that network takes an active role in stimulating participation. We have also learned, from prior surveys as well as this one, that the involvement of representatives of the profession (the physicians themselves) in all key design, planning and analytical stages has a decisive impact on the quality of the research. These approaches to the involvement of physicians in the studies were applied with very positive results. We cannot give acknowledgement to all who contributed; however, we must acknowledge the very substantial assistance from the following:

Harry N. Beaty, M.D., APM Manpower Task Force, Washington, DC
Christopher Blagg, M.D., Northwest Kidney Center, Seattle
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Richard Freeman, M.D., Rochester, New York
Dominick Gentile, M.D., Orange, California
Robert W. Moser, M.D., ACP, Philadelphia
Allen Nissenson, M.D., UCLA Medical Center, Los Angeles

The individuals noted were particularly helpful in the early study design stages, in marshaling the network of physicians who encouraged their colleagues to participate, and in suggesting possible levels of analysis.

The study's physician-advisors played a pivotal role in adapting

USC's log-diary survey instrument to the requirements of the study of end-stage renal disease care. The instrument, which has been used extensively in previous surveys of physicians' professional activities[3,7] (including nephrology) was modified to elicit more specific information related to care for renal dialysis patients.[6] (Portions of the survey instrument are reproduced in the Appendix.) At the same time, the basic survey protocol remains the same as that used in USC's previous national surveys, and many of the measures are identical--thus facilitating direct comparison with previous surveys such as the 1977 survey of nephrology.

In order to avoid major national and regional meetings of renal physicians, two study weeks were used (following a procedure utilized in previous USC surveys). Physicians in the Northeast, North Central and South (N=387) were assigned the study week of October 10-16, 1982, whereas physicians in the West (N=167) were assigned the study week of October 24-30. In each case, potential participants were sent letters of endorsement from the Association of Professors of Medicine, the American College of Physicians, and the Renal Physicians Association, followed by a mailed survey instrument to be completed and returned to USC. As described in greater detail elsewhere,[6] a pivotal feature of the data collection effort was the use of 25 regional representatives organized by the Renal Physicians Association. These regional representatives contacted their fellow physicians prior to and during their assigned study week in order to encourage their participation and to answer any questions they had concerning the study. The active involvement of renal physicians in adapting study instruments, providing organizational endorsements, and urging their colleagues to participate in the study constituted a pivotal factor in the successful completion of the study.

Demographic Characteristics of Respondents

The physicians surveyed were affiliated - administratively and operationally - with one or more of the HCFA-recognized end-stage renal disease patient care centers. Those centers selected for inclusion in the study were asked to provide the names of "physicians who regularly see dialysis patients through your facility, including the medical director. This should include any physician who sees patients currently receiving hemodialysis, CAPD, or other dialysis care. It excludes consultants (e.g., vascular surgeons) and physicians who see patients only irregularly, such as those who fill in for another physician less than once a month." Since a stratification approach was deliberately avoided at each stage of the sampling process, the resulting distribution of physicians should be representative of the population of renal physicians at large (as defined above and subject, of course, to both sampling error and to the alternate-reimbursement stricture imposed on the facility sample).

In Table 1 we present selected facts about the physicians who responded to the survey. The dominance of nephrologists (82%) was not surprising; however, when this statistic is added to the 15% who are general internists, it is clear that there are very few non-internal medicine specialists involved in ESRD care. The majority are found in practice arrangements that give them control over their personal and "on call" time--only 18% noted being in a "solo" type of practice as the predominant arrangement. An almost equal number (17.7%) are in partnerships, while 32.7% are in group practices. A more detailed

## TABLE 1. SELECTED DEMOGRAPHIC CHARACTERISTICS OF THE PHYSICIANS SURVEYED[1]

| Characteristic | N | % |
|---|---|---|
| Primary Specialty | | |
| Nephrology | 271 | 81.9 |
| Internal Medicine | 49 | 14.8 |
| Pediatric Nephrology | 5 | 1.5 |
| Pediatrics | 2 | 0.6 |
| Other | 4 | 1.2 |
| Total | 331 | 100.0 |
| Practice Arrangement | | |
| Solo | 60 | 18.3 |
| Partnership | 58 | 17.7 |
| Group | 107 | 32.7 |
| Institutional | 92 | 28.1 |
| Other | 10 | 3.1 |
| Total | 327 | 100.0 |
| Geographic Region/Division | | |
| *Northeast Region* | *61* | *18.2* |
| New England | 15 | 4.5 |
| Middle Atlantic | 46 | 13.7 |
| *North Central Region* | *91* | *27.1* |
| East North Central | 74 | 22.0 |
| West North Central | 17 | 5.1 |
| *Southern Region* | *90* | *26.8* |
| South Atlantic | 51 | 15.2 |
| East South Central | 9 | 2.7 |
| West South Central | 30 | 8.9 |
| *Western Region* | *94* | *28.0* |
| Mountain | 14 | 4.2 |
| Pacific | 80 | 23.8 |
| United States Total | 336 | 100.0 |
| County Demographic Area | | |
| Non-Metropolitan[2] | 24 | 7.2 |
| Metropolitan: (Population) | | |
| 50,000 - 499,999 | 70 | 20.8 |
| 500,000 - 999,999 | 39 | 11.6 |
| 1 million - 4,999,999 | 160 | 47.6 |
| 5 million or greater | 43 | 12.8 |
| Total | 336 | 100.0 |

TABLE 1. (continued)

| Characteristic | N | % |
|---|---|---|
| Board Certification | | |
| Nephrology Subspecialty Board and American Board of Internal Medicine | 180 | 53.6 |
| American Board of Internal Medicine | 92 | 27.4 |
| Other | 6 | 1.8 |
| None | 58 | 17.3 |
| Total | 336 | 100.0 |
| Sex | | |
| Male | 317 | 94.3 |
| Female | 19 | 5.7 |
| Total | 336 | 100.0 |
| Age | | |
| 25-34 | 48 | 15.7 |
| 35-44 | 168 | 55.1 |
| 45-54 | 73 | 23.9 |
| 55-64 | 16 | 5.2 |
| Total | 305 | 100.0 |

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[1] The total number of respondents to the survey is 336; totals for the characteristics listed above vary due to missing data. Additional physician demographic and practice characteristics from the questionnaire portion of the study booklet are shown in the appendix.

[2] The term "Metropolitan" corresponds to the U.S. Census term "Standard Metropolitan Statistical Area" (SMSA), which is broadly defined to be a county with a central city of 50,000 or more population (may also include contiguous counties that are integrated economically and socially with the county containing the central city). The population categories within "Metropolitan" areas refer to the population of the entire SMSA.

breakdown of respondents' practice arrangements (e.g., single-specialty versus multi-specialty group), along with other physician and practice characteristics not shown in Table 1, are included in the questionnaire shown in the Appendix.

The demographic data presented in Table 1 have been selected in order to facilitate direct comparisons with similar data from the 1977 nephrology study (Table 1.1 in reference 5). Such comparisons show that the 1977 study, which surveyed a random sample of non-federal physicians who were self-designated as nephrologists on the American Medical Association Masterfile of Physicians, yielded a study population that was far different from that represented in this report. In the 1977 study, just 31.2% of the target population was engaged in office-based practice; the remainder were either institutional physicians (19.5%) or fell into a large residual category (49.3%) containing substantial numbers of non-patient care physicians. In the present study, 68.7% are in office-based practice (solo, partnership, and group practice in Table 1), an additional 28.1% are institutional physicians, and just 3.1% fell into the residual ("other") category.

The Region/Division distribution in Table 1 shows a marked clustering of ESRD physicians in the West at the expense of the East. Previously, USC's national surveys have shown a disproportionately high concentration of physicians from all specialties except general and family practice in the Northeastern Region (New England and Middle Atlantic States), approximately proportional representation within the North Central and Western Regions based on their share of the U. S. population, and a slight under-representation within the Southern

Region, with the specialties of general and family practice disportionately concentrated in the South.[1] The unique distribution of ESRD physicians in the present study can be seen by juxtaposing regional data from Table 1 with US Census data, data from the 1977 nephrology survey, and data from a survey of internal medicine conducted in 1976:

| Geographic Region | U.S. POPULATION (1978) % | INTERNAL MEDICINE (1976) % | NEPHROLOGY (1977) % | ESRD PHYSICIANS (1982) % |
|---|---|---|---|---|
| Northeast | 22.5 | 30.6 | 30.4 | 18.2 |
| North Central | 26.6 | 26.8 | 28.2 | 27.1 |
| South | 32.5 | 24.0 | 23.6 | 26.8 |
| West | 18.4 | 18.6 | 17.8 | 28.0 |
| TOTAL | 100.0 | 100.0 | 100.0 | 100.0 |

The percentage distributions for each of the physician groups shown above are based on samples from their respective populations. As such, they are subject to variation in defined target populations (e.g., the restriction to ESRD physicians affiliated with dialysis facilities that were reimbursed under the alternate mode), as well as to the effects of sampling error and differences in response rates (see the discussion of Table 2 below). Presumably, the geographic distribution of ESRD physicians, which (as noted above) resembles the distribution of general and family practitioners more than it does the distribution of specialists in internal medicine, is largely a function of the absence of non-patient care physicians from the survey's target population.

Table 1 also presents the distributions of ESRD physicians by county demographic area, board certification status, sex, and age. Comparisons of these characteristics with those from the 1977 nephrology survey show that ESRD physicians are slightly more likely to practice in a non-metropolitan area than are nephrologists as a whole (7.2% non-metropolitan compared to 4.7%), and are substantially more likely to be Board certified; just 58.0% of respondents to the previous survey were certified by the American Board of Internal Medicine, compared to 81.0% of ESRD physicians (27.4%, plus 53.6% who are certified by ABIM and the Nephrology Subspecialty Board). Finally, ESRD physicians are more likely to be female than nephrologists (5.7% versus 3.6%, although this may be due to changes occurring during the 5 years between the two studies), and they are a somewhat older group of physicians, with 29.1% of their population 45 years and older, compared to 15.8% of nephrologists[5] (although, in a relatively "young" subspecialty, this is undoubtedly partially due to this cohort of physicians gaining 5 years between the two surveys).

### Response Rates

Because previous national surveys of physicians conducted by USC drew their samples from the AMA Physician Masterfile, which contains a fairly comprehensive set of basic demographic data on every physician, it was possible to conduct rigorous statistical comparisons of respondents and non-respondents with regard to possible response bias on a number of dimensions. For the 1977 nephrology survey, the overall response rate was 69.2%, and it was determined that there were no significant differences in response rates among geographic regions, county demographic areas, or physician age groups, and also no significant differences among respondents and non-respondents with respect to practice arrangement or board certification. For USC's 1976 survey of (general) internal medicine, the overall response rate was 52.5%, and it was determined that there were significant differences in response rates among geographic regions and county demographic areas, along with a significantly higher response by board certified physicians.[8] Thus the available physician demographic data from the AMA Masterfile show no evidence of response bias in the 1977 nephrology survey, whereas the internal medicine survey (with its lower response rate) showed significant differences for three of the characteristics tested.

For the current study, the population was defined by using the responses to the "Physician Enumeration Form" sent to dialysis facilities, and therefore the physician demographic data that could be obtained for both respondents and non-respondents are limited to those characteristics that could be reliably determined based solely on the name and address provided on the form. As shown in Table 2, these characteristics are a rudimentary practice type variable ("academic" vs. "private practice"), geographic region, and county demographic area. Region and county demographic area were coded based on the state and city (respectively) provided on the form. Practice type was coded by determining whether the office address provided on the form (or the address shown for the physician in either of two directories of renal physicians*)

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*The directories used were those of the American Society of Nephrology and the American Society of Artificial Internal Organs.

## TABLE 2. RESPONSE RATE COMPARISON[1]

| Category | Response Rate % |
|---|---|
| Total | 65.2 |
| **Practice Type** | |
| Academic | 70.6 |
| Private Practice | 62.9 |
| *Statistical Significance = .15* | |
| **Geographic Region** | |
| Northeast | 67.4 |
| North Central | 76.9 |
| South | 57.1 |
| West | 61.2 |
| *Statistical Significance = *** | |
| **County Demographic Area** | |
| Non-Metropolitan | 75.0 |
| Metropolitan: (Population) | - |
| 50,000 - 499,999 | 60.3 |
| 500,000 - 999,999 | 55.2 |
| 1 million - 4,999,999 | 71.9 |
| 5 million or greater | 54.4 |
| *Statistical Significance = *** | |

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[1] Statistical significance determined by means of the analysis of variance, ** = $\leq$ .01. Of the 554 physicians initially sampled, 515 were found to be eligible for the study; 336 of these completed and returned the study booklet.

corresponded to the address of a medical school. If any such correspondence was found, the physician was classified as an "academic"; if not, he or she was classified as being in private practice.

As shown in Table 2, the overall response to the ESRD survey was 65.2%. Although there is no significant difference by practice type, response rates differ by region, with highest rates in the North Central region and lowest rates in the South, and with the two remaining regions approximating the overall response rate. Similarly, there are significant differences among county demographic area population categories. This latter finding, however, suggests no linear trend, since the lowest response rates occur in medium-size counties (500,000-999,999) and in the most populous areas, whereas the highest rates occur in areas with 1-5 million population, along with non-metropolitan counties.

While the ESRD survey response rate is closer to that achieved in the 1977 nephrology survey than to the (much lower) response to the internal medicine survey, response to the latter study differed as a function of the same two variables found to be significant in Table 2. As shown below, however, the pattern of response within the two demographic characteristics is dissimilar for the two surveys:

| | RESPONSE RATES* | | |
|---|---|---|---|
| | INTERNISTS (1976) % | NEPHROLOGISTS (1977) % | ESRD PHYSICIANS (1982) % |
| TOTAL | 52.5 | 69.0 | 65.2 |
| REGION | | | |
| Northeast | 47.4 | 68.0 | 67.4 |
| North Central | 54.8 | 73.4 | 76.9 |
| South | 51.3 | 68.5 | 57.1 |
| West | 57.4 | 64.9 | 61.2 |
| County Demographic Area | | | |
| Non-Metropolitan | 61.0 | 79.0 | 75.0 |
| Metropolitan (Population) | | | |
| 50,000-499,999 | 57.4 | 69.2 | 60.3 |
| 500,000-999,999 | 60.1 | 66.2 | 55.2 |
| 1 Million or greater | 47.5 | 69.0 | 67.2 |

In the internal medicine survey, the highest response rate is in the West and the lowest in the Northeast, whereas for the ESRD study the North Central is highest and the South lowest. For county demographic area, both studies achieved a higher than average response for non-metropolitan areas, although the patterns found within metropolitan areas differ.

The absence of significant response biases for the 1977 nephrology survey, along with the lack of correspondence between geographic and demographic response patterns for the internal medicine and ESRD surveys, fails to support the supposition that a systematic bias of the type that might affect patient care data supplied by physicians exist in these data sets (since each utilized the same basic instrument and survey approach, and was targeted to a similar population: internists and nephrologists). Further, USC has found that the type of computational adjustments required to correct for variation in response - the use of data weighted by demographic categories - can introduce inaccuracies in resulting statistics due to the use of large or fractional weights. For these reasons, the 336 respondents to the study are treated as representative of the population of ESRD physicians, as this population was defined in the process of drawing the sample.

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*Differences shown for the 1977 nephrology survey are not significant; those for internal medicine and ESRD surveys are statistically significant ($P \leq .01$). The "1 million-499,999" and "5 million or greater" categories from Table 2 have been combined to facilitate comparison with data from the previous surveys.

As noted above, the ESRD survey used a variant of a survey design and protocol that has been used extensively in the past in a series of national surveys. The survey instrument has been subjected to independent studies of its validity and reliability for collecting medical practice data of the type reported here.[9,10] In general, these studies concluded that the workload data and patient encounter data collected in the study were accurately recorded and subject to very minimal loss due to the failure to record. Those deficiencies in the instrument that were found as a result of the validity/reliability studies were rectified in the process of modifying the instrument to meet the requirements of this study of ESRD physicians.

The subsequent sections of this report present data from the study organized according to the sections of the study instrument in which the data were originally recorded: workload and time allocation data, telephone patient encounters, and outpatient/inpatient encounters. A questionnaire with data on the physician and his/her practice is shown in the Appendix.

## PROFESSIONAL ACTIVITIES, WORKLOAD AND ALLOCATION OF TIME

The survey instrument used in the ESRD physician survey incorporated a Week's Practice Summary used to record summary data on professional activities throughout each respondent's assigned study week, as well as a log-diary section that elicited more detailed data for a 3-day period within the study week (below). As shown in Table 3, the Week's Practice Summary details several types of professional and practice activity: telephone calls with health professionals, telephone calls with patients, direct patient encounters (outpatient and inpatient), patients seen by non-physician staff only, and the physician's total professional hours for each day of the week. Each of these categories of practice activity data is shown in two ways. In Table 3, the mean workload data encompass all respondents to the survey; in Table 4, only those respondents who were at work (i.e., those who recorded professional hours) on a given day are included in mean data for that day.

Summing the physician/patient encounter data from Table 3 shows that ESRD physicians have an average of 16.9 telephone calls with patients over a week's time, along with 65.7 outpatient and 47.0 inpatient encounters. These parameters are substantially higher than those found in the 1977 survey of nephrology. The nephrology study, which included non-patient care physicians, showed weekly means of 12.5 telephone calls, 39.7 outpatient encounters, and 38.1 inpatient encounters.* However, the total professional hours reported by the two study

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*Similar data from USC's 1976 study of internal medicine are 31.8 telephone calls, 51.4 outpatient encounters, and 46.1 inpatient encounters

TABLE 3. PRACTICE ACTIVITY BY DAY OF THE WEEK: ALL RESPONDENTS *

| Day of the Week | Telephone Calls With Health Professionals | Patient Encounters | | | | Total Professional Hours (Excluding On Call) |
|---|---|---|---|---|---|---|
| | | Telephone Calls | Out-patients | In-patients | Seen by Non-physician Staff | |
| | Mean | | | | | |
| Sunday | 2.7 | 1.0 | 0.2 | 5.1 | 0.4 | 2.4 |
| Monday | 6.8 | 3.3 | 14.0 | 7.4 | 2.7 | 10.1 |
| Tuesday | 6.6 | 3.0 | 12.2 | 7.2 | 2.3 | 10.3 |
| Wednesday | 6.4 | 2.7 | 11.4 | 7.5 | 2.4 | 9.6 |
| Thursday | 5.9 | 2.9 | 11.5 | 7.2 | 2.0 | 9.6 |
| Friday | 5.9 | 2.9 | 11.2 | 7.5 | 2.2 | 9.0 |
| Saturday | 2.4 | 1.1 | 5.2 | 5.1 | 0.9 | 3.6 |
| | Standard Error of the Mean | | | | | |
| Sunday | .34 | .12 | .05 | .53 | .26 | .19 |
| Monday | .38 | .26 | .85 | .39 | .51 | .22 |
| Tuesday | .32 | .20 | .72 | .39 | .44 | .20 |
| Wednesday | .39 | .20 | .77 | .44 | .45 | .21 |
| Thursday | .38 | .18 | .76 | .43 | .40 | .23 |
| Friday | .34 | .23 | .81 | .43 | .51 | .23 |
| Saturday | .28 | .14 | .73 | .48 | .23 | .23 |

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* The case-base (N) for workload data declines gradually through the week, from a high of 281 for Sunday to 261 for both Friday and Saturday.

TABLE 4. PRACTICE ACTIVITY BY DAY OF THE WEEK: RESPONDENTS WHO WERE AT WORK ON EACH DAY *

| Day of the Week | Telephone Calls With Health Professionals | Patient Encounters: Telephone Calls | Patient Encounters: Out-patients | Patient Encounters: In-patients | Patient Encounters: Seen by Non-physician Staff | Total Professional Hours (Excluding On Call) |
|---|---|---|---|---|---|---|
| | Mean | | | | | |
| Sunday | 4.8 | 1.9 | 0.4 | 9.1 | 0.6 | 4.6 |
| Monday | 7.2 | 3.5 | 14.4 | 7.5 | 2.8 | 10.5 |
| Tuesday | 6.8 | 3.0 | 12.3 | 7.2 | 2.4 | 10.6 |
| Wednesday | 6.6 | 2.8 | 11.7 | 7.6 | 2.5 | 9.9 |
| Thursday | 6.3 | 3.1 | 12.1 | 7.5 | 2.2 | 10.2 |
| Friday | 6.5 | 3.1 | 12.3 | 8.0 | 2.5 | 9.9 |
| Saturday | 3.8 | 1.8 | 8.6 | 8.0 | 1.2 | 5.9 |
| | Standard Error of the Mean | | | | | |
| Sunday | .58 | .20 | .10 | .83 | .50 | .26 |
| Monday | .40 | .27 | .88 | .40 | .55 | .18 |
| Tuesday | .33 | .20 | .73 | .39 | .47 | .18 |
| Wednesday | .41 | .21 | .80 | .45 | .48 | .19 |
| Thursday | .42 | .20 | .79 | .45 | .44 | .18 |
| Friday | .37 | .25 | .86 | .45 | .58 | .17 |
| Saturday | .43 | .22 | 1.14 | .67 | .34 | .25 |

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* The case-base (N) for each day is the number of physicians who reported any professional hours for that day, as follows: Sunday, 149; Monday, 268; Tuesday, 271; Wednesday, 269; Thursday, 249; Friday, 238; and Saturday, 158.

populations are similar; summing the data in the professional hours column of Table 3 shows a total of 54.6 hours per week for ESRD physicians, compared to 53.8 for nephrologists.[5] The table also shows that telephone calls with health professionals are more than twice as frequent as telephone calls with patients on any given day, indicating that the frequency with which this patient population is seen (on dialysis rounds or hospital rounds) relegates their reliance on telephone calls with the physician to a minor role in overall patient care (cf. similar data for internal medicine and family practice[8,11]).

Table 4, which presents means restricted to physicians who were actually at work on a given day, shows that those who work on weekends have fairly full work days. For Saturday, professional hours average 5.9, and a combined total of 16.6 outpatients and inpatients are seen. On Sunday, an average of 4.6 hours is devoted almost exclusively to treating inpatients.

Table 5 disaggregates weekly totals of the three pivotal workload variables from Table 3 (outpatient encounters, inpatient encounters, and professional hours) by selected physician and practice characteristics. The table, which employs the analysis of variance as the operant statistical technique, is designed to assess the impact of training, practice

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per week.[8] Family practitioners (surveyed in 1977) have 32.3 telephone calls, 106.5 outpatient encounters, and 36.3 inpatient encounters.[11] The internists recorded an average of 53.3 professional hours per week, whereas family practitioners had an average of 48.7 professional hours.

### TABLE 5. WEEKLY PRACTICE ACTIVITY (OUTPATIENTS, INPATIENTS, AND HOURS) BY PHYSICIAN AND PRACTICE CHARACTERISTICS[1]

| Characteristics | Case-base (N) | Weekly Patient Encounters | | Weekly Professional Hours (Excluding On Call) |
|---|---|---|---|---|
| | | Outpatients | Inpatients | |
| Total | 246 | 65.7 | 47.0 | 54.6 |
| PRIMARY SPECIALTY | | | | |
| Nephrology | 202 | 66.3 | 47.2 | 54.8 |
| Internal Medicine | 34 | 68.0 | 47.3 | 53.5 |
| Other | 10 | 41.5 | 37.5 | 62.8 |
| *Statistical Significance* | -- | *.39* | *.72* | *.25* |
| PRIMARY PRACTICE ARRANGEMENT | | | | |
| Solo | 49 | 61.8 | 44.8 | 55.5 |
| Group | 117 | 79.2 | 58.6 | 56.8 |
| Institutional | 78 | 46.6 | 29.9 | 52.1 |
| *Statistical Significance* | -- | ** | ** | *.12* |
| PHYSICIAN AGE | | | | |
| Under 40 Years | 118 | 58.6 | 50.7 | 57.1 |
| 40 and Older | 108 | 67.5 | 42.6 | 52.9 |
| *Statistical Significance* | -- | *.22* | *.11* | * |
| BOARD CERTIFICATION BY AMERICAN BOARD OF INTERNAL MEDICINE (ABIM) AND NEPHROLOGY BOARD | | | | |
| Not Board Certified | 44 | 55.5 | 42.7 | 60.3 |
| Certified by ABIM | 66 | 64.4 | 46.3 | 54.1 |
| Certified by ABIM and Nephrology Board | 136 | 69.3 | 48.3 | 53.6 |
| *Statistical Significance* | -- | *.37* | *.71* | * |
| GEOGRAPHIC REGION | | | | |
| Northeast | 50 | 66.7 | 50.4 | 54.9 |
| North Central | 66 | 62.2 | 49.3 | 57.4 |
| South | 60 | 70.1 | 54.5 | 56.0 |
| West | 70 | 63.9 | 34.7 | 51.7 |
| *Statistical Significance* | -- | *.88* | * | *.19* |

TABLE 5. (continued)

| Characteristics | Case-base (N) | Weekly Patient Encounters |  | Weekly Professional Hours (Excluding On Call) |
|---|---|---|---|---|
|  |  | Outpatients | Inpatients |  |
| NON-METROPOLITAN/METROPOLITAN PRACTICE |  |  |  |  |
| Non-Metropolitan Area | 14 | 66.4 | 70.9 | 59.5 |
| Metropolitan Area | 232 | 65.5 | 45.4 | 54.7 |
| *Statistical Significance* | -- | *.95* | * | *.33* |
| NUMBER OF DIALYSIS FACILITIES USED |  |  |  |  |
| One | 94 | 56.5 | 49.3 | 55.0 |
| Two | 73 | 76.9 | 47.2 | 55.7 |
| Three or More | 70 | 68.0 | 43.2 | 54.2 |
| *Statistical Significance* | -- | *.07* | *.60* | *.84* |
| DIRECTOR OF DIALYSIS FACILITY |  |  |  |  |
| Director of Large Facility | 28 | 96.9 | 49.4 | 57.6 |
| Director of Small Facility | 43 | 68.7 | 58.3 | 59.0 |
| Non-Director | 175 | 59.7 | 43.6 | 53.5 |
| *Statistical Significance* | -- | ** | *.08* | *.08* |
| REIMBURSEMENT FOR DIALYSIS |  |  |  |  |
| Initial "Fee for Service" | 38 | 49.3 | 54.5 | 53.7 |
| Alternate "Capitation" | 190 | 70.1 | 45.9 | 55.5 |
| *Statistical Significance* | -- | * | *.22* | *.53* |
| OWNER OF DIALYSIS FACILITY |  |  |  |  |
| Yes | 30 | 77.7 | 59.0 | 50.8 |
| No | 205 | 62.7 | 44.8 | 55.5 |
| *Statistical Significance* | -- | *.16* | *.06* | *.13* |
| AFFILIATED WITH DIALYSIS CHAIN |  |  |  |  |
| Yes | 23 | 62.6 | 58.9 | 57.9 |
| No | 136 | 56.7 | 41.9 | 54.0 |
| *Statistical Significance* | -- | *.63* | * | *.30* |

TABLE 5. (continued)

| | | Weekly Patient Encounters | | Weekly Professional Hours (Excluding On Call) |
|---|---|---|---|---|
| Characteristics | Case-base (N) | Outpatients | Inpatients | |
| NUMBER OF STATIONS AT MOST FREQUENTLY-USED DIALYSIS FACILITY | | | | |
| Low Quartile, 2-11 | 68 | 53.7 | 41.6 | 54.0 |
| Middle 50%, 11-23 | 109 | 65.9 | 49.4 | 56.3 |
| High Quartile, 24-54 | 56 | 83.8 | 49.9 | 55.5 |
| *Statistical Significance* | -- | * | *.36* | *.61* |
| NUMBER OF DIALYSIS PATIENTS | | | | |
| 1-6 | 12 | 37.7 | 20.1 | 47.9 |
| 7-84 | 158 | 59.9 | 44.8 | 55.5 |
| 85 or More | 55 | 96.2 | 59.5 | 57.6 |
| *Statistical Significance* | -- | ** | ** | *.14* |
| NUMBER OF DIALYSIS PATIENTS PER PHYSICIAN | | | | |
| Low Quartile, < 6 | 38 | 53.6 | 44.3 | 53.8 |
| Middle 50%, 6-26 | 80 | 75.0 | 50.1 | 55.8 |
| High Quartile, > 26 | 36 | 97.2 | 60.8 | 57.4 |
| *Statistical Significance* | -- | ** | *.19* | *.59* |
| PRACTICE INCORPORATION | | | | |
| Practice Incorporated | 157 | 75.5 | 52.6 | 55.1 |
| Practice Not Incorporated | 71 | 50.5 | 38.5 | 54.5 |
| *Statistical Significance* | -- | ** | ** | *.79* |

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[1] Weekly totals differ slightly from sums of daily practice activity due to missing data from some respondents. Statistical significance is determined by means of the analysis of variance: * = ≤ .05, ** = ≤ .01.

organization, location, and so forth on productivity. The table shows the level of significance for nonsignificant differences, and uses asterisks to differentiate two levels of significance; one asterisk (*) indicates statistical significance ($P \leq .05$), whereas two asterisks (**) indicate that a difference is highly significant ($P \leq .01$).

The first six variables shown in Table 5 correspond to the demographic characteristics presented in Table 1: specialty, practice arrangement, physician age, board certification, geographic region, and non-metropolitan/metropolitan practice.* As shown in the table, primary specialty had no significant impact on workload data. Practice arrangement differentiated both outpatient and inpatient encounters, with higher numbers of encounters for physicians in office-based (solo and group) practices vis-a-vis their colleagues in institutional practice. Physician age and board certification both have an impact on professional hours, with the highest mean hours for physicians under 40 and those who are not board certified. Finally, both geographic region and non-metropolitan/metropolitan area affected only inpatient encounters, with the lowest weekly means for physicians in the West and those practicing in non-metropolitan areas.

The remaining nine physician and practice characteristics shown in Table 5 deal specifically with dialysis-related features of the respondents' practices. Whereas most of these variables are based on responses to items included in the questionnaire portion of the survey instrument, "director of dialysis facility" is based on information provided on the Physician Enumeration Form (see Appendix) and "affiliated with dialysis chain" is based on facility data provided to USC by HCFA. Of the dialysis-related practice characteristics, neither the number of dialysis facilities used nor the "owner of dialysis facility" variable differentiated workload data. Directors of large dialysis facilities see substantially more outpatients than do either directors of small facilities or non-directors, and a similar impact of facility size can be seen in the effect of the number of stations on outpatient workloads (third page of Table 5). Conversely, affiliation with a dialysis chain has a significant (positive) impact on inpatient volume, but not on outpatients.

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*The seventh characteristic shown in Table 1--physician sex--had too few female physicians for a meaningful comparison of workload data.

The "number of dialysis patients" variable shown in Table 5 presented the researchers with problems of interpretation based on an apparent validity problem for this variable. As shown in the Appendix (Questionnaire item D-6), the source of the data was a question that asked "How many of your own patients are currently receiving the following types of dialysis treatment?" The question then listed five categories: facility hemodialysis, home hemodialysis, CAPD, IPD, and CCPD. When responses to these five categories were summed, the total was often in the hundreds (with the highest total exceeding 300), indicating that some group or institutional physicians may have interpreted the designation "your own patients" in the broadest possible sense, whereas others apparently interpreted it in a much narrower way, thus recording much smaller numbers of patients.* For this reason, the "number of dialysis patients" is treated as a non-metric variable in this analysis, and categories for Table 5 are not created by assigning cases to high and low quartiles (as with metric variables such as "number of stations"). Rather, those in the lowest 5% of the distribution (1-6 dialysis patients) were assigned to one category, those who recorded large numbers of patients (arbitrarily set at 85 or more) were assigned to a second category, and those who fell in between these two extremes (7-84 patients) to a third.** Secondly, a separate variable was created by dividing the number of dialysis patients by the number of physicians in the practice, and categorizing the result into high and low quartiles. As shown in Table 5, the categories for number of dialysis patients do differentiate physicians' workloads, forming a clear continuum for both outpatients and inpatients. The number of patients per physician forms a similar continuum, but achieves statistical significance only for outpatients. The final practice characteristic in Table 5 shows that ESRD physicians in incorporated practices have greater numbers of both outpatient and inpatient encounters. It is notable, however, that neither practice incorporation nor any other dialysis-related practice feature in Table 5 differentiates physicians' professional hours at a significant level.

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*The descriptive questionnaire data for item D-6 in the Appendix are restricted to solo physicians, and thus constitute valid data for this sub-group of the respondents.

**This number of dialysis patients is used as a pivotal criterion variable in subsequent sections of this report. In the regression equations that appear in two of the last sections, it is treated as a valid metric variable, as the introduction of the categorical divisions outlined here would prove impractical in such applications.

The time allocation data presented in Tables 6 through 21 are from the "activity overview" section of the survey instrument. Along with the subsequent two sections of the instrument ("telephone patient encounters" and "outpatient/inpatient encounters") the activity overview represents the true log-diary portion of the research protocol, as it requires the physician to record detailed data on his or her professional activities over a three-day period.* As shown in the Appendix, the activity overview divides each day into 96 fifteen-minute segments into which one of 29 activity codes is entered; respondents were instructed to select the one activity code that best described their activities during that time period. In Tables 6 through 21, some of these 29 activities have been combined to facilitate presentation of the data.

Tables 6 through 20 present time allocation data partitioned by the same series of physician and practice characteristics employed in Table 5. In each case, the statistical significance of differences is tested by means of the analysis of variance, using the significance criteria noted above (* = $\leq .05$; ** = $\leq .01$). In Table 21, an additional criterion variable is created by dividing physicians' weekly workloads into high and low quartiles and using the resulting categories to examine time allocation data.

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*Physicians in the study were randomly assigned to one of two three-day recording periods--either Monday through Wednesday or Thursday through Saturday. The resulting data were merged, and represent one "typical" 24-hour day (excluding Sunday).

In each of the tables, the "total" column shows that ESRD physicians spend 4.8 hours per day in patient care activities, 2.4 hours in other professional activities, 0.7 hours in administrative activities, 1.0 hours in professional travel, and an additional 4.1 hours in "on call" status. Thus, their Monday-Saturday professional day (excluding on call) is 8.9 hours long. By contrast, the 1977 nephrology study showed 4.0 hours per day devoted to patient care activities, 3.6 hours to other professional activities, 0.9 hours to administrative activities, 1.0 hours to professional travel, and an additional 4.2 hours on call, for a total professional day of 9.5 hours (excluding on call). Thus, ESRD physicians devote a greater proportion of their time to patient care and less time to other professional activities than do nephrologists.* The effects of physician and practice characteristics on the allocation of time by ESRD physicians will be discussed below under headings listing the criterion variables used in Tables 6 through 21.

> Physician's Primary Specialty (Table 6) documents a larger proportion of time in office exams and treatments, and in home, industry, school, and nursing home visits for internists, whereas nephrologists spend more time in the

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*The time allocation data for ESRD physicians can be compared directly to identical data for physicians in 23 additional medical and surgical specialties by comparing the "total" column shown in Tables 6 through 21 with data presented in Figure 3.1 of Medical Practice in the United States (Reference 1).

TABLE 6. ACTIVITY OVERVIEW: PHYSICIANS' PRIMARY SPECIALTY

(A 24-Hour Time Period, Sundays Excluded)

| | Primary Specialty | | | | Statistical Significance of Difference |
|---|---|---|---|---|---|
| | Nephrology N=245 | Internal Medicine N=39 | Other N=15 | Total N=299 | ( * = ≤.05) (** = ≤.01) |
| *PATIENT CARE ACTIVITIES* | *4.6* | *5.7* | *4.7* | *4.8* | *.08* |
| Office exams and treatments | 0.9 | 2.6 | 1.8 | 1.1 | ** |
| Telephone calls | 0.4 | 0.4 | 0.5 | 0.4 | .65 |
| Home, industry, school, nursing home visits | 0.0 | 0.1 | 0.0 | 0.0 | ** |
| OPD or clinic exams and treatments | 0.2 | 0.1 | 0.2 | 0.2 | .25 |
| Dialysis unit-outpatient | 1.0 | 0.5 | 0.5 | 0.9 | ** |
| Dialysis unit-inpatient | 0.3 | 0.1 | 0.0 | 0.2 | .06 |
| Emergency room | 0.1 | 0.1 | 0.1 | 0.1 | .57 |
| Hospital-on rounds | 1.8 | 1.8 | 1.7 | 1.8 | .97 |
| *ON CALL* | *4.1* | *4.4* | *4.4* | *4.1* | *.92* |
| *OTHER PROFESSIONAL ACTIVITIES* | *2.4* | *2.0* | *3.0* | *2.4* | *.37* |
| Teaching and teaching-related | 0.7 | 0.4 | 0.6 | 0.6 | .27 |
| Consultations | 0.3 | 0.1 | 0.3 | 0.2 | .10 |
| Research and research-related | 0.5 | 0.0 | 1.2 | 0.5 | ** |
| Continuing education: Meetings, courses, self-instruction, reading professional journals | 0.5 | 1.0 | 0.4 | 0.6 | .09 |
| Other: Personnel supervision, laboratory, health-related committee activities | 0.4 | 0.5 | 0.6 | 0.5 | .68 |
| *ADMINISTRATIVE ACTIVITIES* | *0.7* | *0.6* | *0.8* | *0.7* | *.69* |
| Patient-related: Charts, billing, insurance forms, lab reports, pharmacy | 0.4 | 0.5 | 0.3 | 0.4 | .35 |
| Other: Dictating, salesmen, purchasing, personnel and management | 0.4 | 0.2 | 0.6 | 0.3 | * |
| *PROFESSIONAL TRAVEL* (enroute to hospital, office, meetings, etc.) | *1.0* | *0.8* | *0.9* | *1.0* | *.40* |
| *PERSONAL ACTIVITIES* | *11.2* | *10.5* | *10.2* | *11.0* | *.73* |
| *TOTAL* | *24.0* | *24.0* | *24.0* | *24.0* | — |

outpatient dialysis unit. The small (N=15) "other" group of physicians devotes more time to research and to "other" administrative activities.

Practice Arrangement (Table 7) corroborates the substantial impact of practice type on patterns of activity that has been found in previous USC surveys. Selected findings from among the many significant differences include the lower patient care hours for institutional physicians and their substantially higher teaching and research activities vis-a-vis solo and group practitioners. (This finding of lower patient care time for institutional physicians applies even to "hospital on rounds.") Solo physicians recorded a substantially higher number of on call hours per day (6.9) and, while this may reflect differences in the interpretation of what "on call" means to physicians in different types of practices, it is clear that the professional day for solo physicians is longer--9.6 hours (excluding on call) compared to 8.9 hours for group and 8.8 hours for institutional physicians.

Physician Age (Table 8) shows that younger ESRD physicians spend more time on the telephone with patients and on hospital rounds, whereas those 40 and older devote more time to supervision of personnel, laboratory work, and health-related committee activities.

TABLE 7. ACTIVITY OVERVIEW: PHYSICIANS' PRIMARY PRACTICE ARRANGEMENT--SOLO, GROUP, OR INSTITUTIONAL

(A 24-Hour Time Period, Sundays Excluded)

| | Primary Practice Arrangement | | | | Statistical Significance of Difference ( * = ≤.05) (** = ≤.01) |
|---|---|---|---|---|---|
| | Solo N=52 | Group N=146 | Institutional N=94 | Total N=299 | |
| *PATIENT CARE ACTIVITIES* | *6.1* | *5.7* | *2.9* | *4.8* | ** |
| Office exams and treatments | 1.6 | 1.6 | 0.3 | 1.1 | ** |
| Telephone calls | 0.6 | 0.4 | 0.3 | 0.4 | ** |
| Home, industry, school, nursing home visits | 0.1 | 0.0 | 0.0 | 0.0 | .18 |
| OPD or clinic exams and treatments | 0.1 | 0.1 | 0.4 | 0.2 | ** |
| Dialysis unit-outpatient | 1.1 | 1.0 | 0.7 | 0.9 | ** |
| Dialysis unit-inpatient | 0.2 | 0.3 | 0.2 | 0.2 | .13 |
| Emergency room | 0.1 | 0.1 | 0.0 | 0.1 | ** |
| Hospital-on rounds | 2.4 | 2.1 | 1.1 | 1.8 | ** |
| *ON CALL* | *6.9* | *3.9* | *3.2* | *4.1* | ** |
| *OTHER PROFESSIONAL ACTIVITIES* | *1.7* | *1.7* | *4.0* | *2.4* | ** |
| Teaching and teaching-related | 0.2 | 0.4 | 1.2 | 0.6 | ** |
| Consultations | 0.3 | 0.3 | 0.2 | 0.2 | .58 |
| Research and research-related | 0.1 | 0.1 | 1.3 | 0.5 | ** |
| Continuing education: Meetings, courses, self-instruction, reading professional journals | 0.8 | 0.4 | 0.8 | 0.6 | * |
| Other: Personnel supervision, laboratory, health-related committee activities | 0.3 | 0.5 | 0.5 | 0.5 | .26 |
| *ADMINISTRATIVE ACTIVITIES* | *0.7* | *0.7* | *0.8* | *0.7* | *.44* |
| Patient-related: Charts, billing, insurance forms, lab reports, pharmacy | 0.4 | 0.4 | 0.4 | 0.4 | .56 |
| Other: Dictating, salesmen, purchasing, personnel and management | 0.3 | 0.3 | 0.5 | 0.3 | .06 |
| *PROFESSIONAL TRAVEL* (enroute to hospital, office, meetings, etc.) | *1.1* | *0.8* | *1.1* | *1.0* | *.07* |
| *PERSONAL ACTIVITIES* | *7.5* | *11.2* | *12.0* | *11.0* | ** |
| *TOTAL* | *24.0* | *24.0* | *24.0* | *24.0* | — |

TABLE 8. ACTIVITY OVERVIEW: PHYSICIAN AGE--UNDER 40 YEARS VERSUS 40 AND OLDER

(A 24-Hour Time Period, Sundays Excluded)

| | Physician Age | | | Statistical Significance of Difference ( * = ≤.05) (** = ≤.01) |
|---|---|---|---|---|
| | Under 40 Years N=138 | 40 and Older N=133 | Total N=299 | |
| *PATIENT CARE ACTIVITIES* | *5.1* | *4.5* | *4.8* | *.12* |
| Office exams and treatments | 1.1 | 1.2 | 1.1 | .34 |
| Telephone calls | 0.5 | 0.3 | 0.4 | ** |
| Home, industry, school, nursing home visits | 0.0 | 0.0 | 0.0 | .21 |
| OPD or clinic exams and treatments | 0.2 | 0.1 | 0.2 | .33 |
| Dialysis unit-outpatient | 0.9 | 0.9 | 0.9 | .95 |
| Dialysis unit-inpatient | 0.2 | 0.3 | 0.2 | .38 |
| Emergency room | 0.1 | 0.0 | 0.1 | .53 |
| Hospital-on rounds | 2.1 | 1.6 | 1.8 | ** |
| *ON CALL* | *4.5* | *3.8* | *4.1* | *.17* |
| *OTHER PROFESSIONAL ACTIVITIES* | *2.3* | *2.6* | *2.4* | *.38* |
| Teaching and teaching-related | 0.7 | 0.6 | 0.6 | .84 |
| Consultations | 0.3 | 0.2 | 0.2 | .26 |
| Research and research-related | 0.5 | 0.5 | 0.5 | .98 |
| Continuing education: Meetings, courses, self-instruction, reading professional journals | 0.6 | 0.6 | 0.6 | .59 |
| Other: Personnel supervision, laboratory, health-related committee activities | 0.3 | 0.6 | 0.5 | ** |
| *ADMINISTRATIVE ACTIVITIES* | *0.7* | *0.8* | *0.7* | *.07* |
| Patient-related: Charts, billing, insurance forms, lab reports, pharmacy | 0.4 | 0.4 | 0.4 | .19 |
| Other: Dictating, salesmen, purchasing, personnel and management | 0.3 | 0.4 | 0.3 | .14 |
| *PROFESSIONAL TRAVEL* (enroute to hospital, office, meetings, etc.) | *1.0* | *1.0* | *1.0* | *.80* |
| *PERSONAL ACTIVITIES* | *10.4* | *11.3* | *11.0* | *.24* |
| *TOTAL* | *24.0* | *24.0* | *24.0* | – |

Board Certification (Table 9) has no significant impact on ESRD physicians' allocation of time.

Geographic Region (Table 10) shows more hours in the office by physicians in the West, along with less time in the OPD/clinic and less time devoted to teaching.

Non-Metropolitan versus Metropolitan Area (Table 11) shows an almost equal trade-off between patient care activities and other professional activities, with 1.6 more hours devoted to patient care in non-metropolitan areas, and 1.7 more hours devoted to other professional activities in metropolitan areas.

Number of Dialysis Facilities (Table 12) shows that physicians who use more facilities spend somewhat more time in outpatient dialysis units, and also (not surprisingly) spend more time in professional travel.

Directors of Dialysis Facilities (Table 13) is a criterion variable that was created using both the "director" variable from the Physician Enumeration Form and the "number of stations" variable from the Questionnaire. The table establishes only the greater administrative time allocated by facility directors.

Form of Reimbursement for Dialysis (Table 14) exerts no impact on patient care activities. However, those on fee-for-service reimbursement spend more time on

TABLE 9. ACTIVITY OVERVIEW: BOARD CERTIFICATION BY AMERICAN BOARD OF INTERNAL MEDICINE (ABIM) AND NEPHROLOGY BOAR

(A 24-Hour Time Period, Sundays Excluded)

| | Physician is: Not Board Certified By ABIM N=56 | Board Certified By ABIM N=77 | Board Certified By ABIM and Nephrology Board N=166 | Total N=299 | Statistic Significa of Differ ( * = ≤. (** = ≤. |
|---|---|---|---|---|---|
| *PATIENT CARE ACTIVITIES* | *4.8* | *4.6* | *4.8* | *4.8* | *.88* |
| Office exams and treatments | 1.3 | 1.1 | 1.1 | 1.1 | .81 |
| Telephone calls | 0.4 | 0.4 | 0.4 | 0.4 | .93 |
| Home, industry, school, nursing home visits | 0.0 | 0.0 | 0.0 | 0.0 | .98 |
| OPD or clinic exams and treatments | 0.1 | 0.2 | 0.2 | 0.2 | .62 |
| Dialysis unit-outpatient | 0.9 | 0.9 | 0.9 | 0.9 | .95 |
| Dialysis unit-inpatient | 0.2 | 0.2 | 0.3 | 0.2 | .67 |
| Emergency room | 0.1 | 0.1 | 0.1 | 0.1 | .95 |
| Hospital-on rounds | 1.9 | 1.7 | 1.8 | 1.8 | .84 |
| *ON CALL* | *4.6* | *4.0* | *4.0* | *4.1* | *.68* |
| *OTHER PROFESSIONAL ACTIVITIES* | *2.7* | *2.6* | *2.2* | *2.4* | *.32* |
| Teaching and teaching-related | 0.8 | 0.7 | 0.6 | 0.6 | .29 |
| Consultations | 0.2 | 0.2 | 0.2 | 0.2 | .98 |
| Research and research-related | 0.7 | 0.5 | 0.4 | 0.5 | .22 |
| Continuing education: Meetings, courses, self-instruction, reading professional journals | 0.4 | 0.7 | 0.6 | 0.6 | .57 |
| Other: Personnel supervision, laboratory, health-related committee activities | 0.4 | 0.5 | 0.4 | 0.5 | .82 |
| *ADMINISTRATIVE ACTIVITIES* | *0.7* | *0.7* | *0.8* | *0.7* | *.80* |
| Patient-related: Charts, billing, insurance forms, lab reports, pharmacy | 0.4 | 0.4 | 0.4 | 0.4 | .85 |
| Other: Dictating, salesmen, purchasing, personnel and management | 0.3 | 0.3 | 0.4 | 0.3 | .56 |
| *PROFESSIONAL TRAVEL* (enroute to hospital, office, meetings, etc.) | *0.8* | *1.0* | *1.0* | *1.0* | *.36* |
| *PERSONAL ACTIVITIES* | *10.4* | *11.1* | *11.2* | *11.0* | *.71* |
| *TOTAL* | *24.0* | *24.0* | *24.0* | *24.0* | — |

TABLE 10. ACTIVITY OVERVIEW: GEOGRAPHIC REGION

(A 24-Hour Time Period, Sundays Excluded)

| | Geographic Region | | | | | Statistical Significance of Difference ( * = ≤.05) (** = ≤.01) |
|---|---|---|---|---|---|---|
| | North-East N=57 | North Central N=80 | South N=79 | West N=83 | Total N=299 | |
| *PATIENT CARE ACTIVITIES* | *4.7* | *4.4* | *5.1* | *5.0* | *4.8* | *.36* |
| Office exams and treatments | 0.9 | 0.9 | 1.0 | 1.7 | 1.1 | ** |
| Telephone calls | 0.5 | 0.4 | 0.5 | 0.4 | 0.4 | .41 |
| Home, industry, school, nursing home visits | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | * |
| OPD or clinic exams and treatments | 0.2 | 0.3 | 0.2 | 0.1 | 0.2 | * |
| Dialysis unit-outpatient | 0.9 | 0.8 | 1.0 | 0.9 | 0.9 | .55 |
| Dialysis unit-inpatient | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | .36 |
| Emergency room | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | .07 |
| Hospital-on rounds | 1.7 | 1.7 | 2.1 | 1.7 | 1.8 | .32 |
| *ON CALL* | *4.3* | *3.1* | *4.1* | *5.0* | *4.1* | *.07* |
| *OTHER PROFESSIONAL ACTIVITIES* | *2.5* | *3.2* | *2.1* | *1.8* | *2.4* | ** |
| Teaching and teaching-related | 0.8 | 0.8 | 0.5 | 0.4 | 0.6 | * |
| Consultations | 0.3 | 0.2 | 0.3 | 0.2 | 0.2 | .40 |
| Research and research-related | 0.6 | 0.8 | 0.3 | 0.3 | 0.5 | .07 |
| Continuing education: Meetings, courses, self-instruction, reading professional journals | 0.5 | 0.8 | 0.6 | 0.4 | 0.6 | .16 |
| Other: Personnel supervision, laboratory, health-related committee activities | 0.3 | 0.6 | 0.4 | 0.5 | 0.5 | .11 |
| *ADMINISTRATIVE ACTIVITIES* | *0.8* | *0.8* | *0.7* | *0.7* | *0.7* | *.84* |
| Patient-related: Charts, billing, insurance forms, lab reports, pharmacy | 0.4 | 0.5 | 0.3 | 0.5 | 0.4 | .06 |
| Other: Dictating, salesmen, purchasing, personnel and management | 0.4 | 0.3 | 0.4 | 0.3 | 0.3 | .31 |
| *PROFESSIONAL TRAVEL* (enroute to hospital, office, meetings, etc.) | *1.0* | *0.9* | *1.0* | *0.9* | *1.0* | *.79* |
| *PERSONAL ACTIVITIES* | *10.7* | *11.6* | *11.0* | *10.6* | *11.0* | *.76* |
| *TOTAL* | *24.0* | *24.0* | *24.0* | *24.0* | *24.0* | — |

TABLE 11. ACTIVITY OVERVIEW: NON-METROPOLITAN VERSUS METROPOLITAN AREA

(A 24-Hour Time Period, Sundays Excluded)

| | Respondent Practices in | | | |
|---|---|---|---|---|
| | Non-Metropolitan Area N=19 | Metropolitan Area N=280 | Total N=299 | Statistical Significance of Difference ( * = ≤.05) (** = ≤.01) |
| *PATIENT CARE ACTIVITIES* | *6.3* | *4.7* | *4.8* | ** |
| Office exams and treatments | 2.2 | 1.1 | 1.1 | ** |
| Telephone calls | 0.3 | 0.4 | 0.4 | .58 |
| Home, industry, school, nursing home visits | 0.0 | 0.0 | 0.0 | .65 |
| OPD or clinic exams and treatments | 0.1 | 0.2 | 0.2 | .19 |
| Dialysis unit-outpatient | 0.9 | 0.9 | 0.9 | .92 |
| Dialysis unit-inpatient | 0.2 | 0.2 | 0.2 | .93 |
| Emergency room | 0.1 | 0.1 | 0.1 | .41 |
| Hospital-on rounds | 2.5 | 1.8 | 1.8 | .06 |
| *ON CALL* | *4.4* | *4.1* | *4.1* | *.82* |
| *OTHER PROFESSIONAL ACTIVITIES* | *0.8* | *2.5* | *2.4* | ** |
| Teaching and teaching-related | 0.1 | 0.7 | 0.6 | * |
| Consultations | 0.1 | 0.2 | 0.2 | .19 |
| Research and research-related | 0.0 | 0.5 | 0.5 | .11 |
| Continuing education: Meetings, courses, self-instruction, reading professional journals | 0.2 | 0.6 | 0.6 | .20 |
| Other: Personnel supervision, laboratory, health-related committee activities | 0.4 | 0.5 | 0.5 | .56 |
| *ADMINISTRATIVE ACTIVITIES* | *0.9* | *0.7* | *0.7* | .49 |
| Patient-related: Charts, billing, insurance forms, lab reports, pharmacy | 0.4 | 0.4 | 0.4 | .82 |
| Other: Dictating, salesmen, purchasing, personnel and management | 0.4 | 0.3 | 0.3 | .43 |
| *PROFESSIONAL TRAVEL* (enroute to hospital, office, meetings, etc.) | *0.8* | *1.0* | *1.0* | *.45* |
| *PERSONAL ACTIVITIES* | *10.8* | *11.0* | *11.0* | *.90* |
| *TOTAL* | *24.0* | *24.0* | *24.0* | — |

TABLE 12. ACTIVITY OVERVIEW: NUMBER OF DIALYSIS FACILITIES IN WHICH PHYSICIAN TREATS PATIENTS

(A 24-Hour Time Period, Sundays Excluded)

| | Number of Dialysis Facilities | | | | Statistical Significance of Difference ( * = ≤.05) (** = ≤.01) |
|---|---|---|---|---|---|
| | One N=103 | Two N=93 | Three Or More N=85 | Total N=299 | |
| *PATIENT CARE ACTIVITIES* | *5.1* | *4.7* | *4.8* | *4.8* | *.74* |
| Office exams and treatments | 1.4 | 1.1 | 1.1 | 1.1 | .12 |
| Telephone calls | 0.4 | 0.5 | 0.4 | 0.4 | .54 |
| Home, industry, school, nursing home visits | 0.0 | 0.0 | 0.0 | 0.0 | .89 |
| OPD or clinic exams and treatments | 0.2 | 0.2 | 0.2 | 0.2 | .58 |
| Dialysis unit-outpatient | 0.7 | 1.0 | 1.1 | 0.9 | ** |
| Dialysis unit-inpatient | 0.2 | 0.2 | 0.2 | 0.2 | .90 |
| Emergency room | 0.1 | 0.1 | 0.0 | 0.1 | .30 |
| Hospital-on rounds | 2.0 | 1.7 | 1.8 | 1.8 | .38 |
| *ON CALL* | *5.0* | *3.5* | *4.1* | *4.1* | *.08* |
| *OTHER PROFESSIONAL ACTIVITIES* | *2.7* | *2.4* | *2.1* | *2.4* | *.14* |
| Teaching and teaching-related | 0.7 | 0.6 | 0.6 | 0.6 | .80 |
| Consultations | 0.3 | 0.2 | 0.3 | 0.2 | .35 |
| Research and research-related | 0.5 | 0.6 | 0.3 | 0.5 | .23 |
| Continuing education: Meetings, courses, self-instruction, reading professional journals | 0.8 | 0.5 | 0.4 | 0.6 | .14 |
| Other: Personnel supervision, laboratory, health-related committec activities | 0.5 | 0.5 | 0.4 | 0.5 | .75 |
| *ADMINISTRATIVE ACTIVITIES* | *0.8* | *0.6* | *0.8* | *0.7* | *.10* |
| Patient-related: Charts, billing, insurance forms, lab reports, pharmacy | 0.4 | 0.4 | 0.4 | 0.4 | .75 |
| Other: Dictating, salesmen, purchasing, personnel and management | 0.4 | 0.2 | 0.3 | 0.3 | * |
| *PROFESSIONAL TRAVEL* (enroute to hospital, office, meetings, etc.) | *0.9* | *0.9* | *1.2* | *1.0* | * |
| *PERSONAL ACTIVITIES* | *9.5* | *11.9* | *11.0* | *11.0* | * |
| *TOTAL* | *24.0* | *24.0* | *24.0* | *24.0* | — |

TABLE 13. ACTIVITY OVERVIEW: DIRECTORS OF DIALYSIS FACILITIES VERSUS OTHER PHYSICIANS

(A 24-Hour Time Period, Sundays Excluded)

| | Respondent is: | | | | |
|---|---|---|---|---|---|
| | Director of Large Facility (15 or More Stations) N=34 | Director of Small Facility < Than 15 Stations) N=49 | Non-Director Physician N=216 | Total N=299 | Statistical Significance of Difference ( * = ≤.05) (** = ≤.01) |
| *PATIENT CARE ACTIVITIES* | *4.2* | *5.3* | *4.8* | *4.8* | *.24* |
| Office exams and treatments | 0.9 | 1.2 | 1.2 | 1.1 | .62 |
| Telephone calls | 0.5 | 0.4 | 0.4 | 0.4 | .78 |
| Home, industry, school, nursing home visits | 0.0 | 0.0 | 0.0 | 0.0 | .71 |
| OPD or clinic exams and treatments | 0.2 | 0.3 | 0.2 | 0.2 | .44 |
| Dialysis unit-outpatient | 1.0 | 0.9 | 0.9 | 0.9 | .71 |
| Dialysis unit-inpatient | 0.2 | 0.3 | 0.2 | 0.2 | .30 |
| Emergency room | 0.0 | 0.0 | 0.1 | 0.1 | .31 |
| Hospital-on rounds | 1.3 | 2.1 | 1.8 | 1.8 | .09 |
| *ON CALL* | *3.3* | *4.9* | *4.1* | *4.1* | *.27* |
| *OTHER PROFESSIONAL ACTIVITIES* | *2.4* | *2.1* | *2.4* | *2.4* | *.78* |
| Teaching and teaching-related | 0.7 | 0.4 | 0.7 | 0.6 | .37 |
| Consultations | 0.3 | 0.1 | 0.3 | 0.2 | .18 |
| Research and research-related | 0.3 | 0.5 | 0.5 | 0.5 | .80 |
| Continuing education: Meetings, courses, self-instruction, reading professional journals | 0.6 | 0.5 | 0.6 | 0.6 | .80 |
| Other: Personnel supervision, laboratory, health-related committee activities | 0.5 | 0.6 | 0.4 | 0.5 | .24 |
| *ADMINISTRATIVE ACTIVITIES* | *0.9* | *1.0* | *0.7* | *0.7* | * |
| Patient-related: Charts, billing, insurance forms, lab reports, pharmacy | 0.4 | 0.4 | 0.4 | 0.4 | .78 |
| Other: Dictating, salesmen, purchasing, personnel and management | 0.4 | 0.6 | 0.3 | 0.3 | ** |
| *PROFESSIONAL TRAVEL* (enroute to hospital, office, meetings, etc.) | *1.0* | *1.2* | *0.9* | *1.0* | *.24* |
| *PERSONAL ACTIVITIES* | *12.2* | *9.5* | *11.1* | *11.0* | *.14* |
| *TOTAL* | *24.0* | *24.0* | *24.0* | *24.0* | — |

TABLE 14. ACTIVITY OVERVIEW: FORM OF REIMBURSEMENT FOR DIALYSIS--INITIAL VERSUS ALTERNATIVE METHOD

(A 24-Hour Time Period, Sundays Excluded)

| | Reimbursement for Dialysis | | | |
|---|---|---|---|---|
| | Initial Fee for Service N=43 | Alternate (Capitation) N=225 | Total N=299 | Statistical Significance of Difference ( * = ≤.05) (** = ≤.01) |
| *PATIENT CARE ACTIVITIES* | *5.1* | *4.9* | *4.8* | *.59* |
| Office exams and treatments | 1.0 | 1.2 | 1.1 | .40 |
| Telephone calls | 0.4 | 0.4 | 0.4 | .89 |
| Home, industry, school, nursing home visits | 0.1 | 0.0 | 0.0 | * |
| OPD or clinic exams and treatments | 0.2 | 0.2 | 0.2 | .78 |
| Dialysis unit-outpatient | 0.8 | 0.9 | 0.9 | .53 |
| Dialysis unit-inpatient | 0.4 | 0.2 | 0.2 | ** |
| Emergency room | 0.0 | 0.1 | 0.1 | .52 |
| Hospital-on rounds | 2.1 | 1.8 | 1.8 | .31 |
| *ON CALL* | *4.1* | *4.4* | *4.1* | *.72* |
| *OTHER PROFESSIONAL ACTIVITIES* | *2.8* | *2.3* | *2.4* | *.22* |
| Teaching and teaching-related | 0.9 | 0.6 | 0.6 | .10 |
| Consultations | 0.4 | 0.2 | 0.2 | ** |
| Research and research-related | 0.5 | 0.4 | 0.5 | .74 |
| Continuing education: Meetings, courses, self-instruction, reading professional journals | 0.7 | 0.6 | 0.6 | .67 |
| Other: Personnel supervision, laboratory, health-related committee activities | 0.3 | 0.5 | 0.5 | .23 |
| *ADMINISTRATIVE ACTIVITIES* | *0.5* | *0.8* | *0.7* | * |
| Patient-related: Charts, billing, insurance forms, lab reports, pharmacy | 0.3 | 0.4 | 0.4 | .15 |
| Other: Dictating, salesmen, purchasing, personnel and management | 0.2 | 0.4 | 0.3 | * |
| *PROFESSIONAL TRAVEL* (enroute to hospital, office, meetings, etc.) | *1.1* | *1.0* | *1.0* | *.67* |
| *PERSONAL ACTIVITIES* | *10.4* | *10.6* | *11.0* | *.83* |
| *TOTAL* | *24.0* | *24.0* | *24.0* | — |

consultations and less time in administrative activities.*

Physician Ownership of Dialysis Unit (Table 15) and Affiliation with Dialysis Chain (Table 16) exert virtually no impact upon time allocation, except that "non-owners" devote more time to other professional activities.

Size of Dialysis Facility (Table 17) shows that those in the middle group (11-23 stations) devote more time to patient care activities and spend more time in the emergency room.

Number of Dialysis Patients (Table 18) and Number of Dialysis Patients per Physician (Table 19) show similar results. In both cases, having fewer dialysis patients is associated with more time spent in the office, whereas having more is associated with more time in the outpatient or inpatient dialysis unit.

Practice Incorporation (Table 20) shows that physicians whose practices are incorporated spend significantly more time in office exams, outpatient dialysis, and patient care generally (except for time spent in the

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*Although the target population for the survey was defined as consisting of physicians affiliated with dialysis facilities that are reimbursed under the alternate mode, 15.6% of the respondents reported fee-for-service reimbursement in their "most frequently used" dialysis facility. (See Questionnaire item D-3 in the Appendix.)

## TABLE 15. ACTIVITY OVERVIEW: PHYSICIAN OWNERSHIP OF DIALYSIS UNIT

(A 24-Hour Time Period, Sundays Excluded)

| | Owner or Profit Participant in Dialysis Facility? | | | Statistical Significance of Difference |
|---|---|---|---|---|
| | Yes N=37 | No N=242 | Total N=299 | ( * = ≤.05) (** = ≤.01) |
| *PATIENT CARE ACTIVITIES* | *5.2* | *4.8* | *4.8* | *.41* |
| Office exams and treatments | 1.3 | 1.2 | 1.1 | .59 |
| Telephone calls | 0.3 | 0.5 | 0.4 | .14 |
| Home, industry, school, nursing home visits | 0.0 | 0.0 | 0.0 | .42 |
| OPD or clinic exams and treatments | 0.2 | 0.2 | 0.2 | .69 |
| Dialysis unit-outpatient | 1.0 | 0.9 | 0.9 | .67 |
| Dialysis unit-inpatient | 0.3 | 0.2 | 0.2 | .64 |
| Emergency room | 0.1 | 0.1 | 0.1 | .63 |
| Hospital-on rounds | 2.1 | 1.8 | 1.8 | .21 |
| *ON CALL* | *3.2* | *4.4* | *4.1* | *.16* |
| *OTHER PROFESSIONAL ACTIVITIES* | *1.6* | *2.6* | *2.4* | * |
| Teaching and teaching-related | 0.4 | 0.7 | 0.6 | .08 |
| Consultations | 0.2 | 0.2 | 0.2 | .56 |
| Research and research-related | 0.1 | 0.5 | 0.5 | .09 |
| Continuing education: Meetings, courses, self-instruction, reading professional journals | 0.3 | 0.6 | 0.6 | .13 |
| Other: Personnel supervision, laboratory, health-related committee activities | 0.6 | 0.5 | 0.5 | .46 |
| *ADMINISTRATIVE ACTIVITIES* | *0.8* | *0.7* | *0.7* | *.67* |
| Patient-related: Charts, billing, insurance forms, lab reports, pharmacy | 0.4 | 0.4 | 0.4 | .63 |
| Other: Dictating, salesmen, purchasing, personnel and management | 0.4 | 0.3 | 0.3 | .30 |
| *PROFESSIONAL TRAVEL* (enroute to hospital, office, meetings, etc.) | *1.2* | *1.0* | *1.0* | *.17* |
| *PERSONAL ACTIVITIES* | *12.0* | *10.5* | *11.0* | *.20* |
| *TOTAL* | *24.0* | *24.0* | *24.0* | — |

## TABLE 16. ACTIVITY OVERVIEW: AFFILIATION WITH A DIALYSIS FACILITY THAT IS PART OF A CHAIN

(A 24-Hour Time Period, Sundays Excluded)

| | Respondent is: | | | |
|---|---|---|---|---|
| | Affiliated with a Chain N=30 | Not Affiliated with a Chain N=163 | Total N=299 | Statistical Significance of Difference ( * = ≤.05) (** = ≤.01) |
| *PATIENT CARE ACTIVITIES* | *4.8* | *4.7* | *4.8* | *.89* |
| Office exams and treatments | 1.0 | 1.2 | 1.1 | .49 |
| Telephone calls | 0.5 | 0.4 | 0.4 | .14 |
| Home, industry, school, nursing home visits | 0.0 | 0.0 | 0.0 | .86 |
| OPD or clinic exams and treatments | 0.2 | 0.2 | 0.2 | .71 |
| Dialysis unit-outpatient | 0.8 | 0.9 | 0.9 | .67 |
| Dialysis unit-inpatient | 0.1 | 0.2 | 0.2 | .20 |
| Emergency room | 0.0 | 0.1 | 0.1 | .38 |
| Hospital-on rounds | 2.1 | 1.8 | 1.8 | .35 |
| *ON CALL* | *2.8* | *4.3* | *4.1* | *.09* |
| *OTHER PROFESSIONAL ACTIVITIES* | *2.3* | *2.7* | *2.4* | *.40* |
| Teaching and teaching-related | 0.6 | 0.7 | 0.6 | .54 |
| Consultations | 0.4 | 0.2 | 0.2 | .07 |
| Research and research-related | 0.4 | 0.6 | 0.5 | .61 |
| Continuing education: Meetings, courses, self-instruction, reading professional journals | 0.4 | 0.7 | 0.6 | .38 |
| Other: Personnel supervision, laboratory, health-related committee activities | 0.5 | 0.5 | 0.5 | .79 |
| *ADMINISTRATIVE ACTIVITIES* | *0.7* | *0.8* | *0.7* | *.85* |
| Patient-related: Charts, billing, insurance forms, lab reports, pharmacy | 0.5 | 0.4 | 0.4 | .33 |
| Other: Dictating, salesmen, purchasing, personnel and management | 0.2 | 0.4 | 0.3 | .28 |
| *PROFESSIONAL TRAVEL* (enroute to hospital, office, meetings, etc.) | *1.0* | *0.9* | *1.0* | *.47* |
| *PERSONAL ACTIVITIES* | *12.4* | *10.6* | *11.0* | *.15* |
| *TOTAL* | *24.0* | *24.0* | *24.0* | — |

TABLE 17. ACTIVITY OVERVIEW: SIZE OF PHYSICIANS' MOST FREQUENTLY USED DIALYSIS FACILITY (NUMBER OF STATIONS)

(A 24-Hour Time Period, Sundays Excluded)

| | Number of Dialysis Stations | | | | Statistical Significance of Differenc ( * = ≤.05) (** = ≤.01) |
|---|---|---|---|---|---|
| | 2-10 Low Quartile N=75 | 11-23 Middle 50% N=129 | 24-54 High Quartile N=67 | Total N=299 | |
| *PATIENT CARE ACTIVITIES* | *4.3* | *5.4* | *4.6* | *4.8* | * |
| Office exams and treatments | 1.1 | 1.3 | 1.0 | 1.1 | .39 |
| Telephone calls | 0.4 | 0.5 | 0.4 | 0.4 | .35 |
| Home, industry, school, nursing home visits | 0.1 | 0.0 | 0.0 | 0.0 | .11 |
| OPD or clinic exams and treatments | 0.2 | 0.2 | 0.1 | 0.2 | .22 |
| Dialysis unit-outpatient | 0.7 | 1.0 | 1.1 | 0.9 | .06 |
| Dialysis unit-inpatient | 0.2 | 0.3 | 0.3 | 0.2 | .62 |
| Emergency room | 0.0 | 0.1 | 0.0 | 0.1 | * |
| Hospital-on rounds | 1.6 | 2.0 | 1.7 | 1.8 | .12 |
| *ON CALL* | *4.7* | *4.3* | *3.4* | *4.1* | *.28* |
| *OTHER PROFESSIONAL ACTIVITIES* | *2.8* | *2.4* | *2.2* | *2.4* | *.20* |
| Teaching and teaching-related | 0.8 | 0.6 | 0.6 | 0.6 | .21 |
| Consultations | 0.2 | 0.3 | 0.2 | 0.2 | .55 |
| Research and research-related | 0.7 | 0.4 | 0.3 | 0.5 | .13 |
| Continuing education: Meetings, courses, self-instruction, reading professional journals | 0.5 | 0.6 | 0.7 | 0.6 | .75 |
| Other: Personnel supervision, laboratory, health-related committee activities | 0.5 | 0.5 | 0.4 | 0.5 | .46 |
| *ADMINISTRATIVE ACTIVITIES* | *0.9* | *0.7* | *0.7* | *0.7* | *.12* |
| Patient-related: Charts, billing, insurance forms, lab reports, pharmacy | 0.5 | 0.4 | 0.4 | 0.4 | .53 |
| Other: Dictating, salesmen, purchasing, personnel and management | 0.4 | 0.3 | 0.3 | 0.3 | .13 |
| *PROFESSIONAL TRAVEL* (enroute to hospital, office, meetings, etc.) | *1.0* | *1.1* | *0.9* | *1.0* | *.60* |
| *PERSONAL ACTIVITIES* | *10.3* | *10.1* | *12.2* | *11.0* | *.07* |
| *TOTAL* | *24.0* | *24.0* | *24.0* | *24.0* | — |

TABLE 18. ACTIVITY OVERVIEW: NUMBER OF DIALYSIS PATIENTS (PHYSICIANS' PATIENTS ON HOME OR FACILITY HEMODIALYSIS, CAPD, IPD, OR CCPD)
(A 24-Hour Time Period, Sundays Excluded)

| | Number of Dialysis Patients | | | | |
|---|---|---|---|---|---|
| | 1-6 N=13 | 7-84 N=183 | 85 or More N=65 | Total N=299 | Statistical Significance of Difference ( * = ≤.05) (** = ≤.01) |
| *PATIENT CARE ACTIVITIES* | *5.2* | *5.1* | *5.0* | *4.8* | *.98* |
| Office exams and treatments | 2.4 | 1.3 | 0.9 | 1.1 | ** |
| Telephone calls | 0.6 | 0.5 | 0.3 | 0.4 | .16 |
| Home, industry, school, nursing home visits | 0.1 | 0.0 | 0.0 | 0.0 | .36 |
| OPD or clinic exams and treatments | 0.1 | 0.2 | 0.2 | 0.2 | .63 |
| Dialysis unit-outpatient | 0.4 | 0.9 | 1.3 | 0.9 | ** |
| Dialysis unit-inpatient | 0.1 | 0.2 | 0.4 | 0.2 | * |
| Emergency room | 0.1 | 0.1 | 0.1 | 0.1 | .37 |
| Hospital-on rounds | 1.5 | 1.9 | 1.9 | 1.8 | .66 |
| *ON CALL* | *5.5* | *4.4* | *3.5* | *4.1* | *.24* |
| *OTHER PROFESSIONAL ACTIVITIES* | *2.0* | *2.4* | *2.5* | *2.4* | *.78* |
| Teaching and teaching-related | 0.4 | 0.6 | 0.9 | 0.6 | .18 |
| Consultations | 0.1 | 0.2 | 0.3 | 0.2 | .58 |
| Research and research-related | 0.5 | 0.5 | 0.3 | 0.5 | .63 |
| Continuing education: Meetings, courses, self-instruction, reading professional journals | 0.7 | 0.6 | 0.6 | 0.6 | .96 |
| Other: Personnel supervision, laboratory, health-related committee activities | 0.3 | 0.5 | 0.5 | 0.5 | .55 |
| *ADMINISTRATIVE ACTIVITIES* | *0.4* | *0.8* | *0.8* | *0.7* | *.31* |
| Patient-related: Charts, billing, insurance forms, lab reports, pharmacy | 0.3 | 0.4 | 0.5 | 0.4 | .42 |
| Other: Dictating, salesmen, purchasing, personnel and management | 0.2 | 0.4 | 0.3 | 0.3 | .36 |
| *PROFESSIONAL TRAVEL* (enroute to hospital, office, meetings, etc.) | *0.6* | *1.0* | *0.9* | *1.0* | *.28* |
| *PERSONAL ACTIVITIES* | *10.3* | *10.3* | *11.3* | *11.0* | *.53* |
| *TOTAL* | *24.0* | *24.0* | *24.0* | *24.0* | — |

TABLE 19. ACTIVITY OVERVIEW: NUMBER OF DIALYSIS PATIENTS PER PHYSICIAN (PATIENTS ON HOME OR FACILITY HEMODIALYSIS, CAPD, IPD, OR CCPD)

(A 24-Hour Time Period, Sundays Excluded)

| | Number of Patients Per Physician | | | | Statistical Significance of Difference |
|---|---|---|---|---|---|
| | Less Than 6 Low Quartile N=46 | 6-26 Middle 50% N=95 | More Than 26 High Quartile N=45 | Total N=299 | ( * = ≤.05) (** = ≤.01) |
| *PATIENT CARE ACTIVITIES* | *5.0* | *5.3* | *5.5* | *4.8* | *.72* |
| Office exams and treatments | 2.1 | 1.1 | 1.0 | 1.1 | ** |
| Telephone calls | 0.3 | 0.5 | 0.4 | 0.4 | .41 |
| Home, industry, school, nursing home visits | 0.0 | 0.0 | 0.0 | 0.0 | .09 |
| OPD or clinic exams and treatments | 0.1 | 0.2 | 0.1 | 0.2 | .49 |
| Dialysis unit-outpatient | 0.5 | 1.1 | 1.3 | 0.9 | ** |
| Dialysis unit-inpatient | 0.1 | 0.3 | 0.4 | 0.2 | * |
| Emergency room | 0.0 | 0.1 | 0.1 | 0.1 | .33 |
| Hospital-on rounds | 1.8 | 2.0 | 2.2 | 1.8 | .52 |
| *ON CALL* | *4.1* | *4.0* | *3.7* | *4.1* | *.90* |
| *OTHER PROFESSIONAL ACTIVITIES* | *2.5* | *2.2* | *2.1* | *2.4* | *.61* |
| Teaching and teaching-related | 0.5 | 0.7 | 0.8 | 0.6 | .33 |
| Consultations | 0.1 | 0.3 | 0.3 | 0.2 | * |
| Research and research-related | 0.5 | 0.2 | 0.1 | 0.5 | .17 |
| Continuing education: Meetings, courses, self-instruction, reading professional journals | 0.9 | 0.5 | 0.5 | 0.6 | .19 |
| Other: Personnel supervision, laboratory, health-related committee activities | 0.5 | 0.5 | 0.3 | 0.5 | .25 |
| *ADMINISTRATIVE ACTIVITIES* | *0.8* | *0.8* | *0.9* | *0.7* | *.63* |
| Patient-related: Charts, billing, insurance forms, lab reports, pharmacy | 0.4 | 0.4 | 0.6 | 0.4 | .08 |
| Other: Dictating, salesmen, purchasing, personnel and management | 0.4 | 0.4 | 0.3 | 0.3 | .82 |
| *PROFESSIONAL TRAVEL* (enroute to hospital, office, meetings, etc.) | *0.8* | *1.0* | *0.8* | *1.0* | *.17* |
| *PERSONAL ACTIVITIES* | *10.8* | *10.7* | *11.0* | *11.0* | *.97* |
| *TOTAL* | *24.0* | *24.0* | *24.0* | *24.0* | — |

TABLE 20. ACTIVITY OVERVIEW: PRACTICE INCORPORATION

(A 24-Hour Time Period, Sundays Excluded)

| | Respondent's Practice is | | | |
|---|---|---|---|---|
| | Incorporated N=185 | Not Incorporated N=85 | Total N=299 | Statistical Significance of Difference ( * = ≤.05) (** = ≤.01) |
| *PATIENT CARE ACTIVITIES* | *5.5* | *3.9* | *4.8* | ** |
| Office exams and treatments | 1.5 | 0.6 | 1.1 | ** |
| Telephone calls | 0.5 | 0.4 | 0.4 | .09 |
| Home, industry, school, nursing home visits | 0.0 | 0.0 | 0.0 | .99 |
| OPD or clinic exams and treatments | 0.1 | 0.2 | 0.2 | * |
| Dialysis unit-outpatient | 1.0 | 0.7 | 0.9 | * |
| Dialysis unit-inpatient | 0.3 | 0.2 | 0.2 | .41 |
| Emergency room | 0.1 | 0.1 | 0.1 | .58 |
| Hospital-on rounds | 2.0 | 1.6 | 1.8 | * |
| *ON CALL* | *4.2* | *4.3* | *4.1* | *.84* |
| *OTHER PROFESSIONAL ACTIVITIES* | *2.0* | *3.0* | *2.4* | ** |
| Teaching and teaching-related | 0.5 | 0.8 | 0.6 | ** |
| Consultations | 0.3 | 0.2 | 0.2 | .09 |
| Research and research-related | 0.2 | 0.9 | 0.5 | ** |
| Continuing education: Meetings, courses, self-instruction, reading professional journals | 0.6 | 0.6 | 0.6 | .64 |
| Other: Personnel supervision, laboratory, health-related committee activities | 0.5 | 0.5 | 0.5 | .60 |
| *ADMINISTRATIVE ACTIVITIES* | *0.7* | *0.9* | *0.7* | * |
| Patient-related: Charts, billing, insurance forms, lab reports, pharmacy | 0.4 | 0.4 | 0.4 | .35 |
| Other: Dictating, salesmen, purchasing, personnel and management | 0.3 | 0.5 | 0.3 | * |
| *PROFESSIONAL TRAVEL* (enroute to hospital, office, meetings, etc.) | *0.9* | *1.1* | *1.0* | *.13* |
| *PERSONAL ACTIVITIES* | *10.7* | *10.8* | *11.0* | *.95* |
| *TOTAL* | *24.0* | *24.0* | *24.0* | — |

OPD or clinic), whereas those whose practices are not incorporated devote more time to teaching, research, and certain administrative activities.

Weekly Workload (Table 21), derived from the total of both outpatient and inpatient encounters shown in Table 3, produces the substantial differences one would expect in time allocation data. Patient care activities forms a continuum from 2.9 hours for the low workload quartile to 5.1 hours for the middle 50% and 6.7 hours for the high quartile. Other professional activities, which forms a continuum in the reverse direction, partially offsets this difference, but the effect of patient volume becomes clearly evident by summing the professional hours (excluding on call) for the three groups. For the low quartile, the mean professional hours is 8.1, for the middle 50% it is 8.9 (equivalent to the overall mean), and for the high quartile the mean is 10.1 professional hours per day. Those with higher workloads spend more time on every type of patient encounter except for OPD and clinic care, whereas those with low workloads devote significantly more time to teaching, research, and "other" administrative activities.

The subsequent two sections of this report provide data on the remaining portions of the log-diary: telephone calls with patients, and outpatient/inpatient encounters.

TABLE 21. ACTIVITY OVERVIEW: PHYSICIANS' WEEKLY WORKLOAD (TOTAL OUTPAT AND INPATIENT ENCOUNTERS)

(A 24-Hour Time Period, Sundays Excluded)

| | Weekly Workload | | | | Stati Signi of Di ( * = (** = |
|---|---|---|---|---|---|
| | 1-55 Low Quartile N=49 | 56-150 Middle 50% N=109 | 151 or More High Quartile N=46 | Total N=299 | |
| *PATIENT CARE ACTIVITIES* | *2.9* | *5.1* | *6.7* | *4.8* | ** |
| Office exams and treatments | 0.8 | 1.2 | 1.5 | 1.1 | * |
| Telephone calls | 0.3 | 0.5 | 0.5 | 0.4 | .06 |
| Home, industry, school, nursing home visits | 0.0 | 0.0 | 0.0 | 0.0 | .66 |
| OPD or clinic exams and treatments | 0.2 | 0.2 | 0.2 | 0.2 | .60 |
| Dialysis unit-outpatient | 0.4 | 0.9 | 1.4 | 0.9 | ** |
| Dialysis unit-inpatient | 0.1 | 0.2 | 0.4 | 0.2 | ** |
| Emergency room | 0.0 | 0.0 | 0.1 | 0.1 | ** |
| Hospital-on rounds | 0.9 | 2.0 | 2.6 | 1.8 | ** |
| *ON CALL* | *3.4* | *4.7* | *4.4* | *4.1* | *.15* |
| *OTHER PROFESSIONAL ACTIVITIES* | *3.4* | *2.1* | *1.8* | *2.4* | ** |
| Teaching and teaching-related | 0.9 | 0.6 | 0.5 | 0.6 | * |
| Consultations | 0.2 | 0.2 | 0.3 | 0.2 | .48 |
| Research and research-related | 1.1 | 0.2 | 0.1 | 0.5 | ** |
| Continuing education: Meetings, courses, self-instruction, reading professional journals | 0.7 | 0.5 | 0.5 | 0.6 | .58 |
| Other: Personnel supervision, laboratory, health-related committee activities | 0.5 | 0.5 | 0.4 | 0.5 | .46 |
| *ADMINISTRATIVE ACTIVITIES* | *0.8* | *0.7* | *0.7* | *0.7* | *.40* |
| Patient-related: Charts, billing, insurance forms, lab reports, pharmacy | 0.4 | 0.4 | 0.4 | 0.4 | .82 |
| Other: Dictating, salesmen, purchasing, personnel and management | 0.5 | 0.3 | 0.2 | 0.3 | * |
| *PROFESSIONAL TRAVEL* (enroute to hospital, office, meetings, etc.) | *1.0* | *1.0* | *0.9* | *1.0* | *.57* |
| *PERSONAL ACTIVITIES* | *12.5* | *10.4* | *9.5* | *11.0* | ** |
| *TOTAL* | *24.0* | *24.0* | *24.0* | *24.0* | — |

## TELEPHONE AND PATIENT CARE

Recognizing the potential impact of the telephone as a communication device between physician and patient, USC incorporated a telephone encounter recording form in the study instrument that was designed to elicit detailed information on each such call that occurred during the 3-day recording period. Respondents were asked to "record all telephone calls during which you speak directly to a patient or a member of his/her family regarding clinical and/or counseling services." They were further instructed:

> Do not record consultation calls with other health professionals, pharmacy calls, personal calls, or calls in which a patient merely schedules an appointment. Do not record calls handled totally by other staff. For example, a receptionist may be handling a call but seeks your advice and then returns to the phone. You would not record this call.*

Little is known concerning the content of telephone care by physicians; the data shown in Tables 22 through 32 should provide meaningful insights into what is done for the patient by the use of this medium. In order to obtain the maximum understanding from these descriptive data on telephone encounters, the frequency distributions presented in this section have been divided into separate columns for non-ESRD versus ESRD patients. As shown in Table 27 (below), an ESRD patient is a patient who is on any type of maintenance dialysis--either hemodialysis or peritoneal dialysis. A non-ESRD patient is not currently undergoing renal dialysis, or is undergoing dialysis for acute renal failure. A general finding that can be noted from the "N's" shown at the bottom of each table in this section is that non-ESRD patients account for the majority of the telephone calls with these physicians. This is consistent with the discussion of workload data (above), wherein it was noted that telephone calls may not play a large role in the care of ESRD patients, many of whom will have had an opportunity to speak to the physician during dialysis rounds. Other findings from the telephone encounter data are presented below.

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*Complete variable-by-variable recording instructions for each section of the survey instrument are shown in the Appendix.

_Time in minutes_ (Table 22) varies within a relatively narrow range. The non-ESRD patients have 93% with time of 10 minutes or less, while the ESRD patients have 89% in this category. The mean for both of the distributions is under 7 minutes--6.0 for non-ESRD and 6.7 for ESRD.

_ESRD Patients are slightly older_ (non-ESRD averages 48.5 vs. 51.1 for ESRD) and tend to be clustered more in the middle age ranges than do non-ESRD patients. At age group 35-39, the ESRD percentages are greater than the non-ESRD and generally maintain this differential through age group 75-79 (Table 23).

_Females_ dominate the non-ESRD distribution at 58%, but the males dominate the ESRD distribution at 52.5% (Table 24).

_Is this patient a regular patient_? (Table 25) shows a predominant commitment to patients on a continuous basis whether they are non-ESRD or ESRD; however, the percentages are markedly different with 80.2% "yes" for non-ESRD and 96.3 percent for ESRD. The latter is not unexpected since, for all practical purposes, the ESRD physician is

TABLE 22. TELEPHONE ENCOUNTERS: TIME IN MINUTES *

| Time in Minutes | NON-ESRD PATIENTS N | NON-ESRD PATIENTS % | ESRD PATIENTS N | ESRD PATIENTS % | TOTAL N | TOTAL % |
|---|---|---|---|---|---|---|
| 1 | 34 | 3.0 | 18 | 2.6 | 52 | 2.8 |
| 2 | 119 | 10.4 | 51 | 7.3 | 170 | 9.2 |
| 3 | 161 | 14.1 | 103 | 14.7 | 264 | 14.3 |
| 4 | 101 | 8.8 | 53 | 7.5 | 154 | 8.3 |
| 5 | 362 | 31.6 | 194 | 27.6 | 556 | 30.1 |
| 6 | 47 | 4.1 | 23 | 3.3 | 70 | 3.8 |
| 7 | 30 | 2.6 | 23 | 3.3 | 53 | 2.9 |
| 8 | 41 | 3.6 | 34 | 4.8 | 75 | 4.1 |
| 9 | 5 | 0.4 | 7 | 1.0 | 12 | 0.6 |
| 10 | 160 | 14.0 | 119 | 17.0 | 279 | 15.1 |
| 11-15 | 68 | 5.9 | 57 | 8.1 | 125 | 6.8 |
| 16-20 | 8 | 0.7 | 12 | 1.7 | 20 | 1.1 |
| 21-25 | 1 | 0.1 | 3 | 0.4 | 4 | 0.2 |
| 26-30 | 5 | 0.4 | 3 | 0.4 | 8 | 0.4 |
| More than 30 Minutes | 3 | 0.3 | 2 | 0.3 | 5 | 0.3 |
| Total | 1,145 | 100.0 | 702 | 100.0 | 1,847 | 100.0 |

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* Mean time in minutes for Non-ESRD patient encounters ($\overline{X}$) is 6.0, standard deviation ($\sigma$) is 5.2, ESRD patients $\overline{X} = 6.7$, $\sigma = 4.7$; total: $\overline{X} = 6.3$, $\sigma = 5.0$.

TABLE 23. TELEPHONE ENCOUNTERS: AGE OF PATIENT*

| Age of Patient | NON-ESRD PATIENTS N | NON-ESRD PATIENTS % | ESRD PATIENTS N | ESRD PATIENTS % | TOTAL N | TOTAL % |
|---|---|---|---|---|---|---|
| Less than one year | 16 | 1.4 | 1 | 0.1 | 17 | 0.9 |
| 1-4 | 19 | 1.6 | 2 | 0.3 | 21 | 1.1 |
| 5-9 | 12 | 1.0 | 1 | 0.1 | 13 | 0.7 |
| 10-14 | 18 | 1.5 | 7 | 1.0 | 25 | 1.3 |
| 15-19 | 27 | 2.3 | 4 | 0.6 | 31 | 1.6 |
| 20-24 | 63 | 5.4 | 29 | 4.0 | 92 | 4.9 |
| 25-29 | 87 | 7.4 | 44 | 6.1 | 131 | 7.0 |
| 30-34 | 88 | 7.5 | 45 | 6.2 | 133 | 7.0 |
| 35-39 | 64 | 5.5 | 48 | 6.6 | 112 | 6.0 |
| 40-44 | 81 | 6.9 | 59 | 8.1 | 140 | 7.3 |
| 45-49 | 81 | 6.9 | 70 | 9.7 | 151 | 8.0 |
| 50-54 | 88 | 7.5 | 86 | 11.9 | 174 | 9.1 |
| 55-59 | 77 | 6.7 | 62 | 8.6 | 139 | 7.3 |
| 60-64 | 126 | 10.8 | 72 | 10.0 | 198 | 10.4 |
| 65-69 | 122 | 10.4 | 81 | 11.2 | 203 | 10.7 |
| 70-74 | 97 | 8.3 | 65 | 9.0 | 162 | 8.5 |
| 75-79 | 43 | 3.7 | 32 | 4.4 | 75 | 4.0 |
| 80-84 | 46 | 4.0 | 10 | 1.4 | 56 | 3.0 |
| 85-89 | 12 | 1.0 | 5 | 0.7 | 17 | 0.9 |
| 90-94 | 4 | 0.3 | 0 | 0.0 | 4 | 0.2 |
| 95-older | 0 | 0.0 | 1 | 0.1 | 1 | 0.1 |
| Total | 1,171 | 100.0 | 724 | 100.0 | 1,895 | 100.0 |

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* Mean age of Non-ESRD patients ($\overline{X}$) is 48.5, standard deviation ($\sigma$) is 20.7; ESRD patients $\overline{X} = 51.1$, $\sigma = 16.8$; total: $\overline{X} = 49.5$, $\sigma = 19.3$.

TABLE 24. TELEPHONE ENCOUNTERS: SEX OF PATIENT

| Category Label | NON-ESRD PATIENTS N | NON-ESRD PATIENTS % | ESRD PATIENTS N | ESRD PATIENTS % | TOTAL N | TOTAL % |
|---|---|---|---|---|---|---|
| Male | 495 | 42.0 | 382 | 52.5 | 877 | 46.0 |
| Female | 684 | 58.0 | 345 | 47.5 | 1029 | 54.0 |
| Total | 1,179 | 100.0 | 727 | 100.0 | 1,906 | 100.0 |

the "physician of last resort"--the one who will be with this patient until a physician no longer is needed.

Is this a new problem to you? shows virtually the same percentage as "yes" for both non-ESRD and ESRD patients. Slightly more than one-third of all telephone encounters are for a new problem (Table 26). This very clearly documents the dynamic status of even the most chronic of the chronic patients--the severely ill and long-established ESRD patient; there are changes in health status that are not understood by the patient and/or changes that, while understood, are out of the ordinary. In either event, the patient needs to speak with the physician for evaluation.

Renal dialysis status of patients is shown in Table 27. For the non-ESRD patient, 95% had none (meaning that they were not in a chronic or transitional renal failure state), and the balance were classed as in acute renal failure. The distribution for ESRD patients differs substantially from that for face-to-face encounters (Table 42, below): hospital-based center hemodialysis, 31.4%; free-standing facility hemodialysis, 36.3%; home hemodialysis, 10.5%; CAPD, 18.7%; IPD, 1.9%; and CCPD, 1.2%

Focus of patient's problem is shown in Table 28. The physician's need to be concerned with more than ESRD and ESRD-related problems is very clearly shown in the ESRD distribution, which shows that 16% of the foci are renal or urinary tract related (compared to 30% for non-ESRD), 12% are access device related, 16% are circulatory-system related, and the balance of ESRD foci are distributed in proportions quite similar to those for non-ESRD patients.

TABLE 26. TELEPHONE ENCOUNTERS: NEW PROBLEM TO YOU?

| Category Label | NON-ESRD PATIENTS N | % | ESRD PATIENTS N | % | TOTAL N | % |
|---|---|---|---|---|---|---|
| Yes | 434 | 36.9 | 267 | 36.8 | 701 | 36.9 |
| No | 742 | 63.1 | 459 | 63.2 | 1201 | 63.1 |
| Total | 1,176 | 100.0 | 726 | 100.0 | 1,902 | 100.0 |

TABLE 27. TELEPHONE ENCOUNTERS: RENAL DIALYSIS MODALITY

| Category Label | NON-ESRD PATIENTS N | NON-ESRD PATIENTS % | ESRD PATIENTS N | ESRD PATIENTS % | TOTAL N | TOTAL % |
|---|---|---|---|---|---|---|
| None | 1123 | 95.3 | 0 | 0.0 | 1123 | 58.9 |
| Acute renal failure | 56 | 4.7 | 0 | 0.0 | 56 | 2.9 |
| Hospital-based center hemodialysis | 0 | 0.0 | 228 | 31.4 | 228 | 12.0 |
| Freestanding facility hemodialysis | 0 | 0.0 | 264 | 36.3 | 264 | 14.0 |
| Home hemodialysis | 0 | 0.0 | 76 | 10.5 | 76 | 4.0 |
| CAPD | 0 | 0.0 | 136 | 18.7 | 136 | 7.1 |
| IPD | 0 | 0.0 | 14 | 1.9 | 14 | 0.7 |
| CCPD | 0 | 0.0 | 9 | 1.2 | 9 | 0.5 |
| Total | 1,179 | 100.0 | 727 | 100.0 | 1,906 | 100.0 |

Actions taken in response to the call are shown in Table 29. About one-third of the encounters for each type of patient involved drugs--orders or refills; tests were ordered or results given for 43% of the non-ESRD patients and 27% of the ESRD patients. Feedback to the patient is a prominent feature of the telephone encounter, with over 70% of all patients receiving advice and direction and about 30% actually receiving counseling. Next to the evaluations which lead to decisions concerning the course of treatment for the patient, the feedback that the patient receives may be the most important function of the telephone encounter.

The urgency of the encounter is presented in Table 30. If we assume that "needed to call today" means that the call was received no later than when it needed to be, then the interaction is quite appropriate since only 4.2% actually were viewed as "should have called sooner." Almost 8% of the ESRD patients were in an emergency status, compared with 5% of non-ESRD patients.

Next contact with physician reflects the peculiar status of the ESRD patient who will, in the normal course of events, be seen several times a week if on facility/center dialysis or (if not) every few weeks. Almost 60% of the non-ESRD patients either had a visit scheduled or were told to come in when necessary, compared to 38% of the ESRD patients. However, one-third of the ESRD patients were either going to be seen in the dialysis unit or the emergency room, and 13% had a type of hospital encounter scheduled. Patients essentially put on a stand-by basis by channeling into either a "no further contact" or

TABLE 29. TELEPHONE ENCOUNTERS: ACTIONS TAKEN

| Action | NON-ESRD PATIENTS N | NON-ESRD PATIENTS % | ESRD PATIENTS N | ESRD PATIENTS % | TOTAL N | TOTAL % * |
|---|---|---|---|---|---|---|
| DRUGS: | | | | | | |
| Refill | 93 | 7.9 | 45 | 6.2 | 138 | 7.2 |
| Order | 336 | 28.5 | 176 | 24.2 | 512 | 26.8 |
| TESTS: | | | | | | |
| Give results | 299 | 25.4 | 84 | 11.6 | 383 | 20.2 |
| Order | 209 | 17.7 | 113 | 15.5 | 322 | 16.8 |
| OTHER: | | | | | | |
| Status report | 378 | 32.1 | 172 | 23.7 | 550 | 28.8 |
| Advice/Direction | 848 | 71.9 | 536 | 73.7 | 1384 | 72.4 |
| Counseling | 316 | 26.8 | 225 | 30.9 | 541 | 28.3 |

* Percentages sum to more than 100% due to the fact that more than one such action could be noted for each telephone call.

TABLE 30. TELEPHONE ENCOUNTERS: URGENCY OF PROBLEM

| Category Label | NON-ESRD PATIENTS N | NON-ESRD PATIENTS % | ESRD PATIENTS N | ESRD PATIENTS % | TOTAL N | TOTAL % |
|---|---|---|---|---|---|---|
| None | 141 | 12.1 | 62 | 8.7 | 203 | 10.8 |
| Could have deferred call | 290 | 24.9 | 145 | 20.3 | 435 | 23.1 |
| Needed to call today | 641 | 54.9 | 411 | 57.5 | 1052 | 56.0 |
| Should have called sooner | 37 | 3.2 | 42 | 5.9 | 79 | 4.2 |
| Emergency | 58 | 5.0 | 55 | 7.7 | 113 | 6.0 |
| Total | 1,167 | 100.0 | 715 | 100.0 | 1,882 | 100.0 |

TABLE 31. TELEPHONE ENCOUNTERS: YOUR NEXT CONTACT

| | NON-ESRD PATIENTS | | ESRD PATIENTS | | TOTAL | |
|---|---|---|---|---|---|---|
| Category Label | N | % | N | % | N | % |
| None this problem | 108 | 9.3 | 30 | 4.2 | 138 | 7.3 |
| Telephone | 190 | 16.3 | 75 | 10.4 | 265 | 14.1 |
| OUTPATIENT | | | | | | |
| Return as necessary | 157 | 13.5 | 48 | 6.7 | 205 | 10.9 |
| Visit scheduled | 519 | 44.5 | 216 | 30.1 | 735 | 39.0 |
| House Call | 8 | 0.7 | 4 | 0.6 | 12 | 0.6 |
| INPATIENT | | | | | | |
| At hospital admission | 64 | 5.5 | 48 | 6.7 | 112 | 5.9 |
| On rounds (prior to admission) | 68 | 5.8 | 44 | 6.1 | 112 | 5.9 |
| In surgery | | | | | | |
| ICU/recovery room | 12 | 1.0 | 5 | 0.7 | 17 | 0.9 |
| OTHER | | | | | | |
| Dialysis unit | 3 | 0.3 | 218 | 30.4 | 221 | 11.7 |
| Emergency room | 25 | 2.1 | 25 | 3.5 | 50 | 2.7 |
| Extended care facility (nursing home) | 2 | 0.2 | 1 | 0.1 | 3 | 0.2 |
| Other | 11 | 0.9 | 4 | 0.6 | 15 | 0.8 |
| Total | 1,167 | 100.0 | 718 | 100.0 | 1,885 | 100.0 |

"telephone when needed" state totaled 26% for non-ESRD and 15% for ESRD patients.

Referral is an important component of these physicians' care (Table 32). About 16% of the patients of either type are referred elsewhere based on the telephone call. Further, the evidence from these data (as well as those regarding the next contact) is that the telephone is used as a management routing and planning tool--as well as a device to reassure patients and convey strategic information.

TABLE 32. TELEPHONE ENCOUNTERS: REFERRAL?

| Category Label | NON-ESRD PATIENTS N | NON-ESRD PATIENTS % | ESRD PATIENTS N | ESRD PATIENTS % | TOTAL N | TOTAL % |
|---|---|---|---|---|---|---|
| Yes | 180 | 15.5 | 118 | 16.4 | 298 | 15.8 |
| No | 985 | 84.5 | 602 | 83.6 | 1587 | 84.2 |
| Total | 1,165 | 100.0 | 720 | 100.0 | 1,885 | 100.0 |

## PATIENT ENCOUNTER DESCRIPTIVE STATISTICS

The third section of the 3-day log-diary recording section of the survey instrument was used to collect data on outpatient and inpatient encounters. Respondents were asked to provide data on "each encounter in which you provide clinical and/or counseling services to a patient." As shown in Tables 33 through 52, a large amount of data was collected on each such encounter. For the most part, the information elicited by the form consisted of numerical codes for categorical data that were listed on an adjacent coding key (see Appendix), as well as other data that could be entered in numerical form, e.g., the patient's age. In addition, respondents were asked to provide written diagnoses for each patient seen, and these diagnoses were subsequently coded into numerical categories by study personnel. A total of 11,867 encounters with outpatients and inpatients was recorded. (The totals shown at the bottom of tables differ due to missing data.) As shown in Table 42 (below), non-ESRD and ESRD patients were defined in the same manner as for telephone encounters (with "ESRD" patients including those on any form of maintenance dialysis), and the data are partitioned into non-ESRD and ESRD columns. In contrast to telephone encounters (where non-ESRD patients accounted for the majority of the calls) ESRD patients account for approximately 58% of outpatient and inpatient encounters.

The outpatient/inpatient encounter recording form for patient transactions obtained a series of demographic measures, clinical measures and physician assessments of the severity, urgency and complexity of the problem(s) seen. Other facets of the particular encounter which were recorded include (a) the time spent with the patient, (b) whether the patient was referred by another physician, (c) how often seen in the last six months, (d) race/ethnic group, and (e) disposition of the patient. Tables in this section display distributions for each of the descriptive variables pertinent to the patient-physician interaction. Here we will see the general parameters of patient care on a variable by variable basis. The sections to follow explore selected multivariate relationships.

The time in minutes distribution (Table 33) documents the routinized nature of the bulk of the encounters had by the physician in the ESRD care centers--52% received 5 or less minutes time, compared to 9% for the non-ESRD patients. Even so, a substantial number of the ESRD patients do require an amount of time more analogous to the standard office visit for the non-ESRD patient (or any internists' patient in the office): 31% received from 10 to 15 minutes time compared to 49% for the non-ESRD patient; 9% received from 16 to 30 minutes time compared to 28% in this time interval for the non-ESRD patients. It is clear that almost half of the ESRD patients do require appreciable amounts of the physician's time (5 minutes or more) and, therefore, that they most likely are patients whose care could not be given exclusively to a non-physician. For those ESRD patients receiving 5 or less minutes of time, this must be a management review and time in which the physician reassures the patient and/or gives the patient some specific instructions. The "care" in this instance is largely provided by specialist technicians within the care center.

TABLE 33. OUTPATIENT/INPATIENT ENCOUNTERS: TIME IN MINUTES *

| Time in Minutes | NON-ESRD PATIENTS N | NON-ESRD PATIENTS % | ESRD PATIENTS N | ESRD PATIENTS % | TOTAL N | TOTAL % |
|---|---|---|---|---|---|---|
| 1 | 6 | 0.1 | 202 | 3.3 | 208 | 2.0 |
| 2 | 27 | 0.6 | 488 | 7.9 | 515 | 4.8 |
| 3 | 35 | 0.8 | 634 | 10.3 | 669 | 6.3 |
| 4 | 29 | 0.6 | 251 | 4.1 | 280 | 2.7 |
| 5 | 327 | 7.3 | 1609 | 26.1 | 1936 | 18.2 |
| 6 | 37 | 0.8 | 105 | 1.7 | 142 | 1.3 |
| 7 | 39 | 0.9 | 103 | 1.7 | 142 | 1.3 |
| 8 | 64 | 1.4 | 111 | 1.8 | 175 | 1.6 |
| 9 | 14 | 0.3 | 37 | 0.6 | 51 | 0.5 |
| 10 | 786 | 17.5 | 1118 | 18.1 | 1904 | 17.9 |
| 11-15 | 1396 | 31.0 | 816 | 13.2 | 2212 | 20.8 |
| 16-20 | 649 | 14.4 | 299 | 4.9 | 948 | 8.9 |
| 21-25 | 142 | 3.2 | 61 | 1.0 | 203 | 1.9 |
| 26-30 | 450 | 10.0 | 173 | 2.8 | 623 | 5.8 |
| 31-35 | 42 | 1.0 | 12 | 0.2 | 54 | 0.6 |
| 36-40 | 54 | 1.2 | 26 | 0.4 | 80 | 0.7 |
| 41-45 | 132 | 3.0 | 38 | 0.6 | 170 | 1.6 |
| 46-50 | 25 | 0.6 | 3 | 0.0 | 28 | 0.3 |
| 51-55 | 9 | 0.2 | 6 | 0.1 | 15 | 0.1 |
| 56-60 | 145 | 3.2 | 51 | 0.8 | 196 | 1.8 |
| More than 60 Minutes | 87 | 2.0 | 21 | 0.3 | 108 | 1.0 |
| Total | 4,495 | 100.0 | 6,164 | 100.0 | 10,659 | 100.0 |

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* Mean time in minutes for Non-ESRD patient encounters ($\overline{X}$) is 20.1, standard deviation ($\sigma$) is 18.4; ESRD patients: $\overline{X} = 9.7$, $\sigma = 10.9$; total: $\overline{X} = 14.1$, $\sigma = 15.4$.

The location of encounters is tabulated in Table 34. In discussing the telephone encounter data, we noted a significant number (13%) of planned hospital contacts as dispositions; this is reflected in the distribution in Table 34, with 19% of encounters occurring in non-dialysis and non-emergency-room hospital rooms. The non-ESRD patient is seen 41% of the time in either the office or an OPD/clinic. The ESRD patient encounter locations reflect the dominance of the facilities in providing care--only 5% are in ambulatory locations other than the dialysis unit.

The age distribution of patients is shown in Table 35. There are few important differences between the "non-ESRD" and "ESRD" distributions for patients under age 45; beyond that, there is a clustering of patients in the 45 through 64 age group with the ESRD patients more heavily represented in this group; and finally, the non-ESRD patients are found in substantially larger proportions after age 65. Also notable in the table is the 15% of the ESRD patient distribution who are 70 or more years old.

Males constitute a slight majority of the ESRD patient population (52%) and females are slightly in the majority in the non-ESRD population (also 52%), as shown in Table 36.

Substantial differences in race/ethnicity are shown in Table 37. The distribution for non-ESRD patients is generally similar to national population data (although blacks at 15% are slightly overrepresented and Hispanics slightly underrepresented). The frequency for ESRD patients, however, shows a disproportionately larger percentage of both

TABLE 34. OUTPATIENT/INPATIENT ENCOUNTERS: ENCOUNTER LOCATION

| Category Label | NON-ESRD PATIENTS N | % | ESRD PATIENTS N | % | TOTAL N | % |
|---|---|---|---|---|---|---|
| Office | 1693 | 36.3 | 200 | 3.1 | 1893 | 17.1 |
| OPD/Clinic | 222 | 4.8 | 91 | 1.4 | 313 | 2.8 |
| Outpatient Dialysis Unit | 37 | 0.8 | 4264 | 66.6 | 4301 | 38.9 |
| Inpatient Dialysis Unit | 71 | 1.5 | 569 | 8.9 | 640 | 5.8 |
| Hospital - Other | 2591 | 55.5 | 1240 | 19.4 | 3831 | 34.6 |
| Emergency Room | 32 | 0.7 | 27 | 0.4 | 59 | 0.6 |
| Extended Care (Nursing Home) | 21 | 0.4 | 4 | 0.1 | 25 | 0.2 |
| Home | 2 | 0.0 | 1 | 0.0 | 3 | 0.0 |
| Other | 1 | 0.0 | 3 | 0.0 | 4 | 0.0 |
| Total | 4,670 | 100.0 | 6,399 | 100.0 | 11,069 | 100.0 |

TABLE 35. OUTPATIENT/INPATIENT ENCOUNTERS: AGE OF PATIENT *

| Age of Patient | NON-ESRD PATIENTS N | NON-ESRD PATIENTS % | ESRD PATIENTS N | ESRD PATIENTS % | TOTAL N | TOTAL % |
|---|---|---|---|---|---|---|
| Less than one year | 26 | 0.6 | 4 | 0.1 | 30 | 0.2 |
| 1-4 | 37 | 0.8 | 10 | 0.2 | 47 | 0.4 |
| 5-9 | 23 | 0.5 | 5 | 0.1 | 28 | 0.2 |
| 10-14 | 42 | 0.9 | 16 | 0.3 | 58 | 0.6 |
| 15-19 | 81 | 1.7 | 67 | 1.1 | 148 | 1.3 |
| 20-24 | 162 | 3.5 | 167 | 2.6 | 329 | 3.0 |
| 25-29 | 249 | 5.3 | 277 | 4.3 | 526 | 4.8 |
| 30-34 | 249 | 5.3 | 381 | 6.0 | 630 | 5.7 |
| 35-39 | 236 | 5.1 | 386 | 6.1 | 622 | 5.7 |
| 40-44 | 256 | 5.6 | 449 | 7.1 | 705 | 6.4 |
| 45-49 | 246 | 5.2 | 525 | 8.3 | 771 | 7.0 |
| 50-54 | 341 | 7.3 | 677 | 10.6 | 1018 | 9.2 |
| 55-59 | 372 | 8.1 | 720 | 11.3 | 1092 | 9.9 |
| 60-64 | 564 | 12.1 | 929 | 14.6 | 1493 | 13.6 |
| 65-69 | 533 | 11.5 | 783 | 12.3 | 1316 | 12.0 |
| 70-74 | 533 | 11.5 | 552 | 8.7 | 1085 | 9.9 |
| 75-79 | 347 | 7.4 | 276 | 4.3 | 623 | 5.7 |
| 80-84 | 235 | 5.1 | 112 | 1.8 | 347 | 3.2 |
| 85-89 | 78 | 1.7 | 18 | 0.3 | 96 | 0.9 |
| 90-94 | 28 | 0.6 | 5 | 0.1 | 33 | 0.2 |
| 95-older | 9 | 0.2 | 2 | 0.0 | 11 | 0.1 |
| Total | 4,647 | 100.0 | 6,361 | 100.0 | 11,008 | 100.0 |

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* Mean age of Non-ESRD patients ($\overline{X}$) is 54.6, standard deviation ($\sigma$) is 19.7; ESRD patients: $\overline{X} = 53.4$, $\sigma = 15.7$; total: $\overline{X} = 54.0$, $\sigma = 17.5$.

TABLE 36. OUTPATIENT/INPATIENT ENCOUNTERS: SEX OF PATIENT

| Category Label | NON-ESRD PATIENTS N | NON-ESRD PATIENTS % | ESRD PATIENTS N | ESRD PATIENTS % | TOTAL N | TOTAL % |
|---|---|---|---|---|---|---|
| Male | 2248 | 48.0 | 3350 | 52.4 | 5598 | 50.5 |
| Female | 2438 | 52.0 | 3045 | 47.6 | 5483 | 49.5 |
| Total | 4,686 | 100.0 | 6,395 | 100.0 | 11,081 | 100.0 |

TABLE 37. OUTPATIENT/INPATIENT ENCOUNTERS: RACE-ETHNICITY

| Category Label | NON-ESRD PATIENTS N | NON-ESRD PATIENTS % | ESRD PATIENTS N | ESRD PATIENTS % | TOTAL N | TOTAL % |
|---|---|---|---|---|---|---|
| White (non-Hispanic) | 3707 | 79.4 | 3574 | 56.0 | 7281 | 65.9 |
| Black (non-Hispanic) | 690 | 14.8 | 2150 | 33.7 | 2840 | 25.7 |
| Hispanic | 183 | 3.9 | 499 | 7.8 | 682 | 6.2 |
| Asian or Pacific Islander | 80 | 1.7 | 131 | 2.1 | 211 | 1.9 |
| American Indian or Alaskan Native | 11 | 0.2 | 32 | 0.5 | 43 | 0.3 |
| Total | 4,671 | 100.0 | 6,386 | 100.0 | 11,057 | 100.0 |

minority groups: black (non-Hispanic) accounts for 33%, and Hispanic accounts for 8%--both twice the proportion found in the non-ESRD patient population seen by these same physicians.

The source of patients, displayed in Table 38, shows a relatively large proportion of both the non-ESRD and ESRD patients as self-referred (around 38%), but with a marked skewing toward physician-referral for the ESRD patient and only a modest amount of consultation for this type of patient. Referral at 21% for non-ESRD is consistent with the specialist role; physician-referral (at 54% for ESRD patients compared to 40% for non-ESRD patients) documents a marked shift in responsibility to these physician providers.

A care classification scheme was developed by USC/DRME in its national studies of physician specialties conducted during the 1976-78 time period. Described in detail elsewhere,[4] and applied to classification of patient care for all of internal medicine[12] and for the field of medicine as USC/DRME studied it at the time,[13] it is an empirically-derived approach which considers conditions of access, continuity of care, the breadth of problems addressed by this physician either now or in the past, and the level of responsibility which this physician has for this patient at this time. For a schematic of this algorithm, refer to Figure 1. Five types of care emerge from the application of the algorithm:

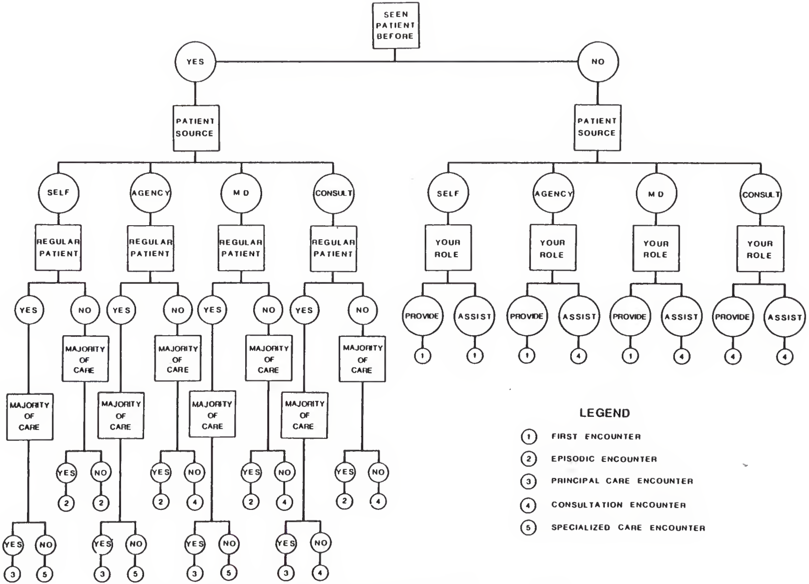
- First Encounters are those where the patient has not been seen before and the visit is not a consultation.

TABLE 38. OUTPATIENT/INPATIENT ENCOUNTERS: PATIENT SOURCE

| Category Label | NON-ESRD PATIENTS N | NON-ESRD PATIENTS % | ESRD PATIENTS N | ESRD PATIENTS % | TOTAL N | TOTAL % |
|---|---|---|---|---|---|---|
| Self/patient | 1775 | 37.9 | 2479 | 38.8 | 4254 | 38.4 |
| Agency | 70 | 1.5 | 56 | 0.9 | 126 | 1.1 |
| Physician | 1854 | 39.6 | 3437 | 53.8 | 5291 | 47.8 |
| Consult | 983 | 21.0 | 413 | 6.5 | 1396 | 12.6 |
| Total | 4,682 | 100.0 | 6,385 | 100.0 | 11,067 | 100.0 |

Figure 1

CARE CLASSIFICATION ALGORITHM



"NO" INCLUDES THAT CASE WHERE THE PROVIDER OF THE MAJORITY OF CARE FOR THIS PATIENT IS UNDETERMINED

- o Consultations, as defined by the algorithm, include those encounters expressly designated as such--those where the physician is assisting some other provider (either a physician or an agency).

- o Specialized and Episodic have discontinuity of care as attributes, even though the physician may be providing the majority of the patient's care for a short period of time.

- o Principal care is an empirically-derived equivalent of what most who report on the topic mean when they talk about "primary care"; the patient has been seen previously and is receiving the majority of his/her care from this physician.

From an application of this algorithm, we would expect to find that more of the non-ESRD patients fall into the discontinuous categories, and we would expect to see proportionately more of the ESRD patients classified as recipients of principal care. In fact, this is what is shown in Table 39; 83% of ESRD patient encounters are categorized as principal care compared to 55% for the non-ESRD patients.

Frequency of encounters is displayed in Table 40, where the clusterings at 71-75 and 76-80 reflect the three-dialysis-per-week norm for facility hemodialysis care. The table documents that well over half of the ESRD patients are seen at least one time a week and that one-third of the patients are seen two to three times a week. This means that the latter patients are seen at each dialysis procedure. The reason for the scattering at lesser frequencies is that these data

TABLE 39. OUTPATIENT/INPATIENT ENCOUNTERS: PRIMARY CARE CLASSIFICATION

| Category Label | NON-ESRD PATIENTS N | NON-ESRD PATIENTS % | ESRD PATIENTS N | ESRD PATIENTS % | TOTAL N | TOTAL % |
|---|---|---|---|---|---|---|
| NON-HOSPITAL: | | | | | | |
| Non-Hospital First Encounters | 140 | 3.0 | 52 | 0.9 | 192 | 1.7 |
| Non-Hospital Episodic Encounters | 42 | 1.0 | 81 | 1.3 | 123 | 1.1 |
| Non-Hospital Principal Care Encounters | 1542 | 33.3 | 3779 | 59.4 | 5321 | 48.4 |
| Non-Hospital Consultations | 140 | 3.0 | 160 | 2.6 | 300 | 2.7 |
| Non-Hospital Specialized Encounters | 127 | 2.7 | 498 | 7.8 | 625 | 5.7 |
| HOSPITAL: | | | | | | |
| Hospital First Encounters | 148 | 3.2 | 24 | 0.4 | 172 | 1.6 |
| Hospital Episodic Encounters | 322 | 7.0 | 67 | 1.1 | 389 | 3.6 |
| Hospital Principal Care Encounters | 986 | 21.3 | 1507 | 23.7 | 2493 | 22.7 |
| Hospital Consultations | 1024 | 22.1 | 124 | 1.9 | 1143 | 10.4 |
| Hospital Specialized Encounters | 164 | 3.6 | 68 | 1.1 | 232 | 2.1 |
| Total | 4,635 | 100.0 | 6,360 | 100.0 | 10,990 | 100.0 |

TABLE 40. OUTPATIENT/INPATIENT ENCOUNTERS: NUMBER OF VISITS *

| Number of visits for Primary Problems Last 6 Months | NON-ESRD PATIENTS | | ESRD PATIENTS | | TOTAL | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| 0 | 813 | 17.8 | 204 | 3.4 | 1017 | 9.6 |
| 1 | 677 | 14.8 | 206 | 3.4 | 883 | 8.3 |
| 2 | 588 | 12.9 | 152 | 2.5 | 740 | 7.0 |
| 3 | 473 | 10.4 | 151 | 2.5 | 624 | 5.9 |
| 4 | 310 | 6.8 | 127 | 2.1 | 437 | 4.1 |
| 5 | 214 | 4.7 | 119 | 2.0 | 333 | 3.1 |
| 6 | 309 | 6.8 | 291 | 4.8 | 600 | 5.7 |
| 7 | 78 | 1.7 | 50 | 0.8 | 128 | 1.2 |
| 8 | 126 | 2.8 | 124 | 2.1 | 250 | 2.4 |
| 9 | 35 | 0.8 | 27 | 0.4 | 62 | 0.6 |
| 10 | 211 | 4.6 | 259 | 4.3 | 470 | 4.4 |
| 11-15 | 289 | 6.3 | 290 | 4.8 | 579 | 5.5 |
| 16-20 | 142 | 3.1 | 250 | 4.2 | 392 | 3.7 |
| 21-25 | 103 | 2.3 | 357 | 5.9 | 460 | 4.3 |
| 26-30 | 58 | 1.3 | 484 | 8.0 | 542 | 5.1 |
| 31-35 | 17 | 0.4 | 110 | 1.8 | 127 | 1.2 |
| 36-40 | 22 | 0.5 | 138 | 2.3 | 160 | 1.5 |
| 41-45 | 5 | 0.1 | 56 | 0.9 | 61 | 0.6 |
| 46-50 | 24 | 0.5 | 238 | 3.9 | 262 | 2.5 |
| 51-55 | 4 | 0.1 | 65 | 1.1 | 69 | 0.7 |
| 56-60 | 12 | 0.3 | 203 | 3.4 | 215 | 2.0 |
| 61-65 | 4 | 0.1 | 49 | 0.8 | 53 | 0.5 |
| 66-70 | 1 | 0.0 | 207 | 3.4 | 208 | 2.0 |
| 71-75 | 17 | 0.4 | 1078 | 17.9 | 1095 | 10.3 |
| 76-80 | 16 | 0.4 | 655 | 10.9 | 671 | 6.3 |
| 81-90 | 1 | 0.0 | 73 | 1.2 | 74 | 0.7 |
| 91-100 | 1 | 0.0 | 33 | 0.6 | 34 | 0.3 |
| 101-110 | 1 | 0.0 | 9 | 0.1 | 10 | 0.1 |
| 111-120 | 1 | 0.0 | 3 | 0.0 | 4 | 0.0 |
| 121-130 | 1 | 0.0 | 5 | 0.1 | 6 | 0.1 |
| 131-140 | 2 | 0.0 | 0 | 0.0 | 2 | 0.0 |
| 141-150 | 3 | 0.1 | 2 | 0.0 | 5 | 0.0 |
| 151-160 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 161-170 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 171-180 | 1 | 0.0 | 10 | 0.2 | 11 | 0.1 |
| 181-190 | 1 | 0.0 | 5 | 0.1 | 6 | 0.1 |
| 191-200 | 0 | 0.0 | 1 | 0.0 | 1 | 0.0 |
| Total | 4,560 | 100.0 | 6,031 | 100.0 | 10,591 | 100.0 |

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* Mean number of visits for Non-ESRD patients ($\bar{X}$) is 6.6, standard deviation ($\sigma$) is 12.2; ESRD patients: $\bar{X} = 39.6$, $\sigma = 30.9$; total: $\bar{X} = 26.0$, $\sigma = 30.0$.

represent a point-in-time for the physician's practice and patients, some of whom have been with the physician only a short (but unknown) period.

Renal disease etiology proportions are shown in Table 41. Over 40% of the non-ESRD patients had no renal disease noted for the primary presenting problem. Hypertension is a major problem for both types of patients; 12% for the non-ESRD patients and 28% for the ESRD patients. Both glomerulonephritis and diabetic nephropathy have a substantial prevalence--accounting for a combined total of 15% of the non-ESRD encounters and 42% of the ESRD encounters.

Type of maintenance dialysis is shown in Table 42. Acute renal failure characterizes 11% of the non-ESRD patients. Those who are in an ESRD status are allocated as follows: hospital-based hemodialysis, 39.5%; free-standing facility hemodialysis, 50.4%; self-care dialysis (home hemodialysis, CAPD, and CCPD), 7.4%; and IPD, 2.7%.* In subsequent sections of this report, dialysis type is employed as a key variable in analyses of the care provided to ESRD patients.

Diagnostic tests associated with care are presented in Table 43. The fact that they add to over 100% indicates that more than one test

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*In the "Comparison of two days of data" analysis shown in the Appendix, type of dialysis is employed as one of three variables examined for possible biases in ESRD encounter data based on the fact that some hemodialysis patients may be seen twice (on dialysis rounds) over a three-day recording period. The analysis, which also examined diagnostic tests (Table 43) and complexity of service (Table 45), showed that there were no important differences in these key patient encounter variables attributable to the use of a 3-day log-diary recording schedule for patient encounters.

TABLE 41. OUTPATIENT/INPATIENT ENCOUNTERS: RENAL DISEASE ETIOLOGY

| Category Label | NON-ESRD PATIENTS N | NON-ESRD PATIENTS % | ESRD PATIENTS N | ESRD PATIENTS % | TOTAL N | TOTAL % |
|---|---|---|---|---|---|---|
| None | 1978 | 42.4 | 6 | 0.1 | 1984 | 18.2 |
| Primary hypertensive disease (Nephrosclerosis, benign or malignant) | 568 | 12.2 | 1729 | 27.7 | 2297 | 21.1 |
| Glomerulonephritis | 378 | 8.1 | 1459 | 23.4 | 1837 | 16.8 |
| Diabetic nephropathy | 321 | 6.9 | 1137 | 18.2 | 1458 | 13.4 |
| Polycystic kidney disease | 84 | 1.8 | 409 | 6.6 | 493 | 4.5 |
| Collagen vascular disease | 101 | 2.2 | 169 | 2.7 | 270 | 2.5 |
| Hereditary interstitial nephritis | 12 | 0.3 | 59 | 0.9 | 71 | 0.7 |
| Analgesic abuse nephropathy | 28 | 0.6 | 79 | 1.3 | 107 | 1.0 |
| Other interstitial nephritis (including pyelonephritis) | 222 | 4.8 | 349 | 5.6 | 571 | 5.2 |
| Obstructive uropathy, acquired | 148 | 3.2 | 137 | 2.2 | 285 | 2.6 |
| Obstructive uropathy, congenital | 25 | 0.5 | 66 | 1.1 | 91 | 0.8 |
| Amyloidosis | 11 | 0.2 | 20 | 0.3 | 31 | 0.3 |
| Multiple myeloma | 21 | 0.4 | 44 | 0.7 | 65 | 0.6 |
| Gouty nephropathy | 12 | 0.3 | 25 | 0.4 | 37 | 0.3 |
| Other or unknown etiology | 758 | 16.2 | 556 | 8.9 | 1314 | 12.0 |
| Total | 4,667 | 100.0 | 6,244 | 100.0 | 10,911 | 100.0 |

TABLE 42. OUTPATIENT/INPATIENT ENCOUNTERS: RENAL DIALYSIS MODALITY

| Category Label | NON-ESRD PATIENTS |  | ESRD PATIENTS |  | TOTAL |  |
|---|---|---|---|---|---|---|
|  | N | % | N | % | N | % |
| None | 4194 | 89.1 | 0 | 0.0 | 4194 | 37.7 |
| Acute renal failure | 512 | 10.9 | 0 | 0.0 | 512 | 4.6 |
| Hospital-based center hemodialysis | 0 | 0.0 | 2530 | 39.5 | 2530 | 22.8 |
| Freestanding facility hemodialysis | 0 | 0.0 | 3229 | 50.4 | 3229 | 29.0 |
| Home hemodialysis | 0 | 0.0 | 118 | 1.8 | 118 | 1.1 |
| CAPD | 0 | 0.0 | 312 | 4.9 | 312 | 2.8 |
| IPD | 0 | 0.0 | 174 | 2.7 | 174 | 1.6 |
| CCPD | 0 | 0.0 | 48 | 0.7 | 48 | 0.4 |
| Total | 4,706 | 100.0 | 6,411 | 100.0 | 11,117 | 100.0 |

TABLE 43. OUTPATIENT/INPATIENT ENCOUNTERS: DIAGNOSTIC TESTS

| Category Label | Non-ESRD Patients N | Non-ESRD Patients % | ESRD Patients N | ESRD Patients % | Total N | Total % |
|---|---|---|---|---|---|---|
| None | 1170 | 24.9 | 3384 | 52.8 | 4554 | 41.0 |
| Blood chemistry | 1755 | 37.3 | 1407 | 21.9 | 3162 | 28.4 |
| Routine lab: CBC, urinalysis | 1628 | 34.6 | 1290 | 20.1 | 2918 | 26.2 |
| "Panel" - automated (e.g., SMA-12) | 1215 | 25.8 | 876 | 13.7 | 2091 | 18.8 |
| Chest X-ray | 587 | 12.5 | 351 | 5.5 | 938 | 8.4 |
| ECG | 429 | 9.1 | 263 | 4.1 | 692 | 6.2 |
| Doctor examination of urine | 533 | 11.3 | 38 | 0.6 | 571 | 5.1 |
| Culture | 274 | 5.8 | 218 | 3.4 | 492 | 4.4 |
| Tests - other | 244 | 5.2 | 173 | 2.7 | 417 | 3.8 |
| Arterial puncture | 210 | 4.5 | 76 | 1.2 | 286 | 2.6 |
| Creatinine clearance | 258 | 5.5 | 16 | 0.2 | 274 | 2.5 |
| Radiology - other | 134 | 2.8 | 103 | 1.6 | 237 | 2.1 |
| Renal function - other | 215 | 4.6 | 15 | 0.2 | 230 | 2.1 |
| Immunologic test | 111 | 2.4 | 91 | 1.4 | 202 | 1.8 |
| Ultrasound | 138 | 2.9 | 39 | 0.6 | 177 | 1.6 |
| Quantitative urine protein | 165 | 3.5 | 6 | 0.1 | 171 | 1.5 |
| Enzymes | 77 | 1.6 | 55 | 0.9 | 132 | 1.2 |
| GI X-ray | 68 | 1.4 | 44 | 0.7 | 112 | 1.0 |
| Radioisotopic imaging | 94 | 2.0 | 17 | 0.3 | 111 | 1.0 |
| Cat scan | 68 | 1.4 | 32 | 0.5 | 100 | 0.9 |
| Liver function | 49 | 1.0 | 34 | 0.5 | 83 | 0.7 |
| Hormonal Assays | 54 | 1.1 | 25 | 0.4 | 79 | 0.7 |
| Serology/VD | 51 | 1.1 | 21 | 0.3 | 72 | 0.6 |
| Intravenous urography | 70 | 1.5 | 0 | 0.0 | 70 | 0.6 |
| Thyroid function | 53 | 1.1 | 10 | 0.2 | 63 | 0.6 |
| Arteriography/venography | 35 | 0.7 | 21 | 0.3 | 56 | 0.5 |
| Breast exam | 44 | 0.9 | 4 | 0.1 | 48 | 0.4 |
| Bone survey | 18 | 0.4 | 27 | 0.4 | 45 | 0.4 |
| Pap smear | 41 | 0.9 | 3 | 0.0 | 44 | 0.4 |
| Pulmonary function | 24 | 0.5 | 19 | 0.3 | 43 | 0.4 |

TABLE 43. (continued)

| Category Label | Non-ESRD Patients N | Non-ESRD Patients % | ESRD Patients N | ESRD Patients % | Total N | Total % |
|---|---|---|---|---|---|---|
| Biopsy - renal | 27 | 0.6 | 2 | 0.0 | 29 | 0.3 |
| EEG | 16 | 0.3 | 13 | 0.2 | 29 | 0.3 |
| Endoscopy - other | 13 | 0.3 | 11 | 0.1 | 24 | 0.2 |
| Cystogram | 8 | 0.2 | 16 | 0.2 | 24 | 0.2 |
| Lipid screen | 16 | 0.3 | 6 | 0.1 | 22 | 0.2 |
| Catheterization - other | 11 | 0.2 | 9 | 0.1 | 20 | 0.2 |
| Renal concentration test | 20 | 0.4 | 0 | 0.0 | 20 | 0.2 |
| Biopsy - other | 14 | 0.3 | 4 | 0.1 | 18 | 0.2 |
| Nerve conduction/EMG | 6 | 0.1 | 11 | 0.2 | 17 | 0.2 |
| Cystoscopy | 10 | 0.2 | 4 | 0.1 | 14 | 0.1 |
| Glucose tolerance | 11 | 0.2 | 1 | 0.0 | 12 | 00.1 |
| Lumbar puncture | 7 | 0.1 | 4 | 0.1 | 11 | 0.1 |
| Retrograde urography | 9 | 0.2 | 1 | 0.0 | 10 | 0.1 |
| Renal vein catheterization | 5 | 0.1 | 5 | 0.1 | 10 | 0.1 |
| Skin test | 5 | 0.1 | 5 | 0.1 | 10 | 0.1 |
| Needle aspiration | 4 | 0.1 | 5 | 0.1 | 9 | 0.1 |
| Bone marrow | 4 | 0.1 | 4 | 0.1 | 8 | 0.1 |
| Audiometry | 3 | 0.1 | 5 | 0.1 | 8 | 0.1 |
| Total | 10,001 | 212.2 | 8,764 | 136.7 | 18,765 | 168.8 |

was being ordered or employed for each of the patients. It is interesting to note that the "none" category is noted for 25% of the non-ESRD patients and 53% of the ESRD patients. The fact that the patient's condition has been established and the care protocol largely routinized would explain the very large percentage of "none" for ESRD patients. Also, the ESRD patient is seen several times a week, minimizing the need for multiple diagnostic testing such as the automated "panel"--used for 26% of the non-ESRD patients compared to 14% of the ESRD patients.

Therapeutic procedures and their use are tabulated in Table 44. Note that dialysis is not one of the procedures listed in the table because the locational code, i.e., where the patient is seen (Table 34), establishes the patient's involvement in dialysis at this time, along with the code that designates which of the several types of maintenance dialysis is involved. Several therapeutic procedures that are directly related to dialysis are noted, i.e., vascular catheterization for dialysis access, access device surgery, and shunt declotting. Almost twice as many non-ESRD patients (48%) as ESRD patients (27%) received systemic drugs. Diet was an important instruction for 11% of the non-ESRD and 8% of the ESRD patients. About 14% of all patients received therapeutic listening; patient education of a non-specified character occurred in 11% of all encounters. The low percentage for all forms of surgery is explained by the fact that none of these physicians was a surgeon; anything that this group did would have been relatively minor and routine.

TABLE 44. OUTPATIENT/INPATIENT ENCOUNTERS: THERAPEUTIC PROCEDURES

| Category Label | Non-ESRD Patients N | Non-ESRD Patients % | ESRD Patients N | ESRD Patients % | Total N | Total % |
|---|---|---|---|---|---|---|
| Drugs - systemic | 2258 | 48.0 | 1709 | 26.7 | 3967 | 35.7 |
| None | 1097 | 23.3 | 2405 | 37.5 | 3502 | 31.5 |
| Therapeutic listening/ reassurance | 578 | 12.0 | 980 | 15.3 | 1558 | 14.0 |
| Patient education - other | 589 | 12.5 | 595 | 9.3 | 1184 | 10.7 |
| Intravenous fluids | 722 | 15.3 | 348 | 5.4 | 1070 | 9.6 |
| Diet | 524 | 11.1 | 496 | 7.7 | 1020 | 9.2 |
| Rx - other | 351 | 7.5 | 664 | 10.4 | 1015 | 9.1 |
| Family/social/sexual | 212 | 4.5 | 206 | 3.2 | 418 | 3.8 |
| Exercise/activity | 173 | 3.7 | 203 | 3.2 | 376 | 3.4 |
| Transfusion | 82 | 1.7 | 183 | 2.9 | 265 | 2.4 |
| Steroids/immunosuppressive therapy | 146 | 3.1 | 70 | 1.1 | 216 | 1.9 |
| Vascular catheterization for dialysis access | 45 | 1.0 | 133 | 2.1 | 178 | 1.6 |
| Injections - other | 94 | 2.0 | 64 | 1.0 | 158 | 1.4 |
| Patient dialysis training | 39 | 0.8 | 97 | 1.5 | 136 | 1.2 |
| Drugs - topical | 44 | 0.9 | 64 | 1.0 | 108 | 1.0 |
| Physical rehabilitation | 42 | 0.9 | 55 | 0.9 | 97 | 0.9 |
| Access device surgery | 40 | 0.8 | 44 | 0.7 | 84 | 0.8 |
| Tubing change | 30 | 0.6 | 53 | 0.8 | 83 | 0.7 |
| Dressing: Apply/remove | 17 | 0.4 | 63 | 1.0 | 80 | 0.7 |
| Immunizations | 47 | 1.0 | 25 | 0.4 | 72 | 0.6 |
| Psychotherapy | 28 | 0.6 | 38 | 0.6 | 66 | 0.6 |
| Peritoneal catheterization | 30 | 0.6 | 29 | 0.5 | 59 | 0.5 |
| Urinary catheterization | 44 | 0.9 | 9 | 0.1 | 53 | 0.5 |
| Prosthesis/aids | 16 | 0.3 | 22 | 0.3 | 38 | 0.3 |
| Chemotherapy | 23 | 0.5 | 14 | 0.2 | 37 | 0.3 |
| Surgery - other | 23 | 0.5 | 12 | 0.2 | 35 | 0.3 |
| Vascular catheterization, non-nephrologic | 22 | 0.5 | 9 | 0.1 | 31 | 0.3 |
| Incision/drainage | 7 | 0.1 | 15 | 0.2 | 22 | 0.2 |
| Shunt declotting | 5 | 0.1 | 16 | 0.2 | 21 | 0.2 |

TABLE 44. (continued)

| Category Label | Non-ESRD Patients | | ESRD Patients | | Total | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| Minor tissue removal | 7 | 0.1 | 12 | 0.2 | 19 | 0.2 |
| Renal transplantation | 11 | 0.2 | 7 | 0.1 | 18 | 0.2 |
| Debridement | 8 | 0.2 | 10 | 0.2 | 18 | 0.2 |
| Suture removal | 6 | 0.1 | 8 | 0.1 | 14 | 0.1 |
| Radiation therapy | 7 | 0.1 | 5 | 0.1 | 12 | 0.1 |
| Mechanical relief of urinary obstruction | 8 | 0.2 | 4 | 0.1 | 12 | 0.1 |
| Paracentesis | 4 | 0.1 | 6 | 0.1 | 10 | 0.1 |
| Anesthetization | 8 | 0.2 | 1 | 0.0 | 9 | 0.1 |
| Foreign body removal | 2 | 0.0 | 6 | 0.1 | 8 | 0.1 |
| Suturing only | 4 | 0.1 | 1 | 0.0 | 5 | 0.0 |
| Dilatation/curettage | 2 | 0.0 | 2 | 0.0 | 4 | 0.0 |
| Arthrocentesis | 2 | 0.0 | 1 | 0.0 | 3 | 0.0 |
| Cauterization/cryotherapy | 1 | 0.0 | 1 | 0.0 | 2 | 0.0 |
| Contraceptives, incl. IUD | 1 | 0.0 | 1 | 0.0 | 2 | 0.0 |
| Total | 7,399 | 156.5 | 8,686 | 135.5 | 16,085 | 144.6 |

Complexity of service categories were developed by the California Relative Value System of the California Medical Association[14] and by the American Medical Association in their "Current Procedural Terminology."[15] The study participants were given succinct definitions of each category, based on the two referenced sources.* Table 45 presents the distribution of complexity for both types of patients. It is clear that the ESRD patients presented less complex care problems than their non-ESRD counterparts; 58% of the ESRD and 23% of the non-ESRD patient encounters were rated as "minimal" or "brief" in complexity.

The severity of the patient's problem(s), according to an established scale, is presented in Table 46. The meaning of these categories is clear to physicians as they are accustomed to describing patients and the patients' problems in these terms. On this dimension, both groups of patients appear to be in need of about the same attention from physicians, as there are few differences in the respective distributions.

The urgency associated with care is noted in Table 47, where the two distributions are in virtual agreement with respect to the appropriateness of seeing the physician today (63% versus 61%) and differ the most in terms of the proportion of encounters that could have been

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*The definitions of the complexity of service categories shown in Table 45 are provided in the Appendix (see: "Coding of complexity of service"). The definitions appear in conjunction with an analysis of the complexity coding patterns of the study's respondents--whether they coded Medicare patients differently from their other patients, and whether there is a "response-set" involved in the coding of complexity across an individual physician's patient population.

TABLE 45. OUTPATIENT/INPATIENT ENCOUNTERS: COMPLEXITY OF SERVICE

| Category Label | NON-ESRD PATIENTS N | NON-ESRD PATIENTS % | ESRD PATIENTS N | ESRD PATIENTS % | TOTAL N | TOTAL % |
|---|---|---|---|---|---|---|
| Minimal | 229 | 5.0 | 1730 | 27.5 | 1959 | 18.0 |
| Brief | 843 | 18.3 | 1938 | 30.8 | 2781 | 25.6 |
| Limited | 2031 | 44.2 | 1682 | 26.7 | 3713 | 34.1 |
| Extended | 928 | 20.2 | 729 | 11.6 | 1657 | 15.2 |
| Comprehensive | 569 | 12.4 | 218 | 3.5 | 787 | 7.2 |
| Total | 4,600 | 100.0 | 6,297 | 100.0 | 10,897 | 100.0 |

TABLE 46. OUTPATIENT/INPATIENT ENCOUNTERS: SEVERITY OF PROBLEM

| Category Label | NON-ESRD PATIENTS N | NON-ESRD PATIENTS % | ESRD PATIENTS N | ESRD PATIENTS % | TOTAL N | TOTAL % |
|---|---|---|---|---|---|---|
| None | 221 | 4.8 | 1156 | 18.4 | 1377 | 12.6 |
| Minor - acute | 233 | 5.1 | 301 | 4.8 | 534 | 4.9 |
| Minor - chronic | 647 | 14.0 | 1406 | 22.3 | 2053 | 18.8 |
| Moderate - acute | 990 | 21.5 | 674 | 10.7 | 1664 | 15.3 |
| Moderate - chronic | 1365 | 29.6 | 1653 | 26.3 | 3018 | 27.7 |
| Severe - acute | 718 | 15.6 | 343 | 5.5 | 1061 | 9.7 |
| Severe - chronic | 433 | 9.4 | 760 | 12.1 | 1193 | 10.9 |
| Total | 4,607 | 100.0 | 6,293 | 100.0 | 10,900 | 100.0 |

TABLE 47. OUTPATIENT/INPATIENT ENCOUNTERS: URGENCY OF PROBLEM

| Category Label | NON-ESRD PATIENTS N | NON-ESRD PATIENTS % | ESRD PATIENTS N | ESRD PATIENTS % | TOTAL N | TOTAL % |
|---|---|---|---|---|---|---|
| None | 408 | 8.9 | 1356 | 21.6 | 1764 | 16.2 |
| Could have been deferred | 976 | 21.3 | 900 | 14.3 | 1876 | 17.3 |
| Needed to see today | 2904 | 63.3 | 3825 | 60.9 | 6729 | 61.9 |
| Should have seen sooner | 151 | 3.3 | 73 | 1.2 | 224 | 2.1 |
| Emergency | 150 | 3.3 | 125 | 2.0 | 275 | 2.5 |
| Total | 4,589 | 100.0 | 6,279 | 100.0 | 10,868 | 100.0 |

deferred (larger proportion for non-ESRD) and those that had the "none" category noted (22% for ESRD versus 9% for non-ESRD).

The physician's next contact and location of that contact appear in Table 48. Very few patients were put in the "none" category--about 3% overall. A visit was scheduled for 34% of the non-ESRD patients and 14% of the ESRD patients (meaning, in the latter instance, at a time other than the scheduled time for dialysis). Almost half of the non-ESRD patients were scheduled to be seen either at hospital admission or "on rounds," with an additional 5% to be seen in the ICU/recovery room. This hospital encounter profile for non-ESRD patients is in sharp contrast to the ESRD patients, who had 22% scheduled for hospital-type encounters other than the dialysis unit. "Dialysis unit," at 61% for the ESRD patients, is the most common next contact noted. From these data, one can easily view the non-ESRD patient population as being relatively sick and as having complex problems that require the use of hospital facilities. The ESRD patients are largely in an established encounter mode, either in the dialysis unit or, for those whose problems become overly complex, in the hospital.

Referral and consultation are measures of patient problem complexity and difficulty. Table 49 presents the statistics for the two patient populations. "None" as a category means that the physician is comfortable with the treatment program underway and feels no need for the involvement of another physician--a fact that applies to 83% of the non-ESRD and 91% of the ESRD patients. Five percent of the non-ESRD patients were being returned to their referring physician. The 12%

TABLE 48. OUTPATIENT/INPATIENT ENCOUNTERS: NEXT CONTACT

| Category Label | NON-ESRD PATIENTS N | NON-ESRD PATIENTS % | ESRD PATIENTS N | ESRD PATIENTS % | TOTAL N | TOTAL % |
|---|---|---|---|---|---|---|
| YOUR NEXT CONTACT | | | | | | |
| None this problem | 166 | 3.6 | 147 | 2.3 | 313 | 2.9 |
| Telephone | 106 | 2.3 | 22 | 0.3 | 128 | 1.2 |
| OUTPATIENT | | | | | | |
| Return as necessary | 219 | 4.8 | 43 | 0.7 | 262 | 2.4 |
| Visit scheduled | 1583 | 34.4 | 876 | 13.9 | 2459 | 22.5 |
| House call | 4 | 0.1 | 1 | 0.0 | 5 | 0.0 |
| INPATIENT | | | | | | |
| At hospital admission | 90 | 2.0 | 65 | 1.0 | 155 | 1.4 |
| On rounds (prior admission) | 2157 | 46.8 | 1221 | 19.3 | 3378 | 30.9 |
| In surgery | 0 | 0.0 | 2 | 0.0 | 2 | 0.0 |
| ICU/recovery room | 208 | 4.5 | 66 | 1.0 | 274 | 2.5 |
| OTHER | | | | | | |
| Dialysis unit | 54 | 1.2 | 3867 | 61.2 | 3921 | 35.9 |
| Emergency room | 1 | 0.0 | 1 | 0.0 | 2 | 0.0 |
| Extended care facility (nursing home) | 5 | 0.1 | 4 | 0.1 | 9 | 0.1 |
| DOA/death | 7 | 0.2 | 2 | 0.0 | 9 | 0.1 |
| Other | 5 | 0.1 | 5 | 0.1 | 10 | 0.1 |
| Total | 4,605 | 100.0 | 6,322 | 100.0 | 10,927 | 100.0 |

TABLE 49. OUTPATIENT/INPATIENT ENCOUNTERS: REFERRAL/CONSULTATION

| Category Label | NON-ESRD PATIENTS N | NON-ESRD PATIENTS % | ESRD PATIENTS N | ESRD PATIENTS % | TOTAL N | TOTAL % |
|---|---|---|---|---|---|---|
| None | 3811 | 83.1 | 5698 | 91.2 | 9509 | 87.7 |
| Return to referral source | 230 | 5.0 | 36 | 0.6 | 266 | 2.5 |
| Medical specialist for care | 75 | 1.6 | 36 | 0.6 | 111 | 1.0 |
| Medical specialist for consult | 149 | 3.2 | 117 | 1.9 | 266 | 2.5 |
| Surgical specialist for care | 87 | 1.9 | 125 | 2.0 | 212 | 2.0 |
| Surgical specialist for consult | 151 | 3.3 | 161 | 2.6 | 312 | 2.9 |
| Dentist | 4 | 0.1 | 5 | 0.1 | 9 | 0.1 |
| Physician Extender (e.g., Medex, Nurse practitioner, Physician's Assistant) | 6 | 0.1 | 14 | 0.2 | 20 | 0.2 |
| Therapist/technician (e.g., dietary) | 26 | 0.6 | 24 | 0.4 | 50 | 0.5 |
| Public agency/social worker | 12 | 0.3 | 17 | 0.3 | 29 | 0.3 |
| Other | 34 | 0.7 | 17 | 0.3 | 51 | 0.5 |
| Total | 4,585 | 100.0 | 6,250 | 100.0 | 10,835 | 100.0 |

referral rate for the non-ESRD patients (all categories except "none" and "return to referral source") has about the same relative proportions within types of referral as for the ESRD patients' 8% referrals. About 5% of the encounters for each type of patient involved a surgeon in referral or consultation. About 5% of the non-ESRD patients were sent to medical specialists either for care or consultation, compared to half that percentage for the ESRD patients--a not-too-surprising finding, given the routinized and established character of the care given to ESRD patients.

The patient's diagnoses are presented in Tables 50 (primary), 51 (secondary) and 52 (tertiary). These are categorized in The International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM) system--a system that permits four-digit specification of disease type. For example, hypertensive renal disease (code 403) is further specified as either malignant (403.0), benign (403.1) or unspecified (403.9). In these distributions, we present the diagnoses to the three-digit level. We have arbitrarily selected the leading 20 conditions for these tables.

The primary diagnosis for the two populations shows non-ESRD patients, on the one hand, with a diversified profile of problems which are quite similar to those found by USC/DRME in its earlier nephrology study[5] (although the percentages for specific conditions are more similar to those associated with general internal medicine[8]). The reason for this is that non-ESRD patients constitute that subset whose primary problem has been expressly identified as not end-stage renal disease; it may be (and usually is) renal disease, but not of sufficient chronicity and seriousness to warrant treatment as an end-stage renal disease patient. The ESRD patients, on the other hand, are highly concentrated under four conditions: chronic renal failure, 41%; hypertensive renal disease, 10%; diabetes mellitus, 8%; chronic glomerulonephritis, 8%. Twenty conditions for the ESRD patients account for 88% of all encounters; for the non-ESRD patients, twenty account for 60%. In USC's 1977 study of nephrologists, the leading twenty accounted for 72% and had slightly more non-renal disease conditions (primarily circulatory) enumerated as primary problems.[5] It is clear from Table 50 that any non-renal disease condition noted as a primary diagnosis (with the exception of cardiovascular and other respiratory ailments) occurs at a very low frequency.

The secondary diagnostic conditions noted in Table 51 show a continued dominance of renal conditions with some increase in cardiovascular and genitourinary conditions. In almost 38% of ESRD cases, there is no secondary condition noted--which we could interpret as meaning that "ESRD" was the overwhelmingly important label; whatever else was present, it was either not important in the management of that patient or had a trivial impact on the patient's care.

The tertiary diagnostic conditions tabulated in Table 52 show a slightly broader spread of conditions than noted in either the secondary or primary condition distributions. However, 85% of all encounters had no tertiary conditions noted--a further indication that the primary

TABLE 50. OUTPATIENT/INPATIENT ENCOUNTERS: PRIMARY DIAGNOSIS

| Category Label | NON-ESRD PATIENTS N | NON-ESRD PATIENTS % | ESRD PATIENTS N | ESRD PATIENTS % | TOTAL N | TOTAL % |
|---|---|---|---|---|---|---|
| Chronic renal failure | 185 | 3.9 | 2650 | 41.3 | 2835 | 25.5 |
| Hypertensive renal disease | 338 | 7.2 | 641 | 10.0 | 979 | 8.8 |
| Diabetes mellitus | 288 | 6.1 | 530 | 8.3 | 818 | 7.4 |
| Chronic glomerulonephritis | 115 | 2.4 | 501 | 7.8 | 616 | 5.5 |
| Acute renal failure | 355 | 7.5 | 21 | 0.3 | 376 | 3.4 |
| Essential hypertension | 354 | 7.5 | 17 | 0.3 | 371 | 3.3 |
| No recorded diagnosis | 168 | 3.6 | 201 | 3.1 | 369 | 3.3 |
| Nephritis/nephrology, not specified as acute or chronic | 88 | 1.9 | 194 | 3.0 | 282 | 2.5 |
| Renal failure, unspecified | 93 | 2.0 | 151 | 2.4 | 244 | 2.2 |
| Congenital anomalies of urinary system | 53 | 1.1 | 196 | 3.1 | 249 | 2.2 |
| Other disorders of urethra and urinary tract | 127 | 2.7 | 83 | 1.3 | 210 | 1.9 |
| Organ or tissue replaced by transplant | 163 | 3.5 | 44 | 0.7 | 207 | 1.9 |
| Complications peculiar to certain specified procedures | 27 | 0.6 | 122 | 1.9 | 149 | 1.3 |
| Heart failure | 96 | 2.0 | 33 | 0.5 | 129 | 1.1 |
| Erythematous conditions | 66 | 1.4 | 59 | 0.9 | 125 | 1.1 |
| Infections of kidney | 53 | 1.1 | 63 | 1.0 | 116 | 1.0 |
| Disorders of fluid, electrolyte, and acid-base balance | 86 | 1.8 | 27 | 0.4 | 113 | 1.0 |
| Septicema | 56 | 1.2 | 32 | 0.5 | 88 | 0.8 |
| Other symptoms involving abdomen and pelvis | 47 | 1.0 | 30 | 0.5 | 77 | 0.7 |
| Other chronic ischemic heart disease | 55 | 1.2 | 15 | 0.2 | 70 | 0.6 |
| Total | 4,706 | 59.7 | 6,411 | 87.5 | 11,117 | 75.5 |

TABLE 51. OUTPATIENT/INPATIENT ENCOUNTERS: SECONDARY DIAGNOSIS

| Category Label | NON-ESRD PATIENTS N | NON-ESRD PATIENTS % | ESRD PATIENTS N | ESRD PATIENTS % | TOTAL N | TOTAL % |
|---|---|---|---|---|---|---|
| No recorded diagnosis | 1793 | 38.1 | 2395 | 37.4 | 4188 | 37.7 |
| Hypertensive renal disease | 253 | 5.4 | 553 | 8.6 | 806 | 7.3 |
| Chronic renal failure | 126 | 2.7 | 512 | 8.0 | 638 | 5.7 |
| Diabetes mellitus | 240 | 5.1 | 361 | 5.6 | 601 | 5.4 |
| Nephritis/nephrology, not specified as acute or chronic | 135 | 2.9 | 383 | 6.0 | 518 | 4.7 |
| Chronic glomerulonephritis | 47 | 1.0 | 288 | 4.5 | 335 | 3.0 |
| Other chronic ischemic heart disease | 94 | 2.0 | 140 | 2.2 | 234 | 2.1 |
| Essential hypertension | 151 | 3.2 | 33 | 0.5 | 184 | 1.7 |
| Heart failure | 83 | 1.8 | 100 | 1.6 | 183 | 1.7 |
| Renal failure, unspecified | 47 | 1.0 | 79 | 1.2 | 126 | 1.1 |
| Complications peculiar to certain specified procedures | 23 | 0.5 | 88 | 1.4 | 111 | 1.0 |
| Other disorders of urethra and urinary tract | 66 | 1.4 | 40 | 0.6 | 106 | 1.0 |
| Congenital anomalies of urinary system | 22 | 0.5 | 82 | 1.3 | 104 | 1.0 |
| Chronic obstructive pulmonary disease | 51 | 1.1 | 52 | 0.8 | 103 | 1.0 |
| Acute renal failure | 88 | 1.9 | 8 | 0.1 | 96 | 0.9 |
| Disorders of fluid, electrolyte, and acid-base balance | 53 | 1.1 | 31 | 0.5 | 84 | 0.8 |
| Depressive disorders, not classified | 46 | 1.0 | 36 | 0.6 | 82 | 0.8 |
| Other unspecified anemias | 17 | 0.4 | 63 | 1.0 | 80 | 0.8 |
| Septicema | 60 | 1.3 | 19 | 0.3 | 79 | 0.7 |
| Ill-defined descriptions and complications of heart disease | 36 | 0.8 | 31 | 0.5 | 67 | 0.6 |
| Total | 4,706 | 73.2 | 6,411 | 82.7 | 11,117 | 79.0 |

TABLE 52. OUTPATIENT/INPATIENT ENCOUNTERS: TERTIARY DIAGNOSIS

| Category Label | NON-ESRD PATIENTS |  | ESRD PATIENTS |  | TOTAL |  |
|---|---|---|---|---|---|---|
|  | N | % | N | % | N | % |
| No recorded diagnosis | 4120 | 87.6 | 5372 | 83.8 | 9492 | 85.4 |
| Hypertensive renal disease | 50 | 1.1 | 125 | 2.0 | 175 | 1.6 |
| Nephritis/nephrology, not specified as acute or chronic | 21 | 0.5 | 98 | 1.6 | 119 | 1.1 |
| Other chronic ischemic heart disease | 24 | 0.6 | 68 | 1.1 | 92 | 0.9 |
| Chronic renal failure | 16 | 0.3 | 66 | 1.0 | 82 | 0.8 |
| Heart failure | 35 | 0.7 | 46 | 0.8 | 81 | 0.8 |
| Diabetes mellitus | 34 | 7.2 | 40 | 0.6 | 74 | 0.7 |
| Other unspecified anemias | 16 | 0.3 | 28 | 0.4 | 44 | 0.4 |
| Chronic obstructive pulmonary disease | 10 | 0.2 | 31 | 0.5 | 41 | 0.4 |
| Depressive disorders, not classified | 16 | 0.3 | 21 | 0.4 | 37 | 0.3 |
| Angina pectoris | 13 | 0.3 | 23 | 0.4 | 36 | 0.3 |
| Septicema | 18 | 0.4 | 14 | 0.3 | 32 | 0.3 |
| Essential hypertension | 23 | 0.5 | 5 | 0.1 | 28 | 0.3 |
| Complications peculiar to certain specified procedures | 3 | 0.1 | 25 | 0.4 | 28 | 0.3 |
| Disorders of fluid, electrolyte, and acid-base balance | 16 | 0.3 | 11 | 0.2 | 27 | 0.2 |
| Other, unspecified protein-calorie malnutrition | 22 | 0.5 | 4 | 0.1 | 26 | 0.2 |
| Cardiac dysrhythmias | 11 | 0.2 | 12 | 0.2 | 23 | 0.2 |
| Renal failure, unspecified | 10 | 0.2 | 10 | 0.2 | 20 | 0.2 |
| General symptoms | 6 | 0.1 | 13 | 0.2 | 19 | 0.2 |
| Disorders of parathyroid gland | 6 | 0.1 | 11 | 0.2 | 17 | 0.2 |
| Total | 4,706 | 101.5 | 6,411 | 94.5 | 11,117 | 94.8 |

condition listing and, to some extent the secondary, provided adequate descriptive options for the physicians.

In the next section, the relationship of structural and demograph variables to patient care are explored. By means of contingency tables and through multiple regressions, salient insights regarding th impact of different modalities of care (including case-mix differences in that care) should be evident. The section just completed has given the reader an understanding of the overall parameters of practice organization and the care rendered; the next section examines strategic relationships of these variables.

## ANALYSIS OF OUTPATIENT/INPATIENT ENCOUNTER DATA

The patient encounter characteristics set forth above can be separated into sets of exogenous (or precursor) and endogenous variables for the purpose of applying bivariate or multivariate statistical techniques. Previously, the patient's renal disease status (ESRD versus non-ESRD) was used to partition descriptive data; here, the inferential analysis focuses on the 6,411 encounters with ESRD patients and employs selected exogenous variables for bivariate comparisons: Patient age, race/ethnicity, type of dialysis and encounter location. These variables constitute structural precursor variables that are essentially "constants" (not under the physician's control) for the particular encounter, and can thus be used to partition data on the actions taken by the physician during the patient encounter. Subsequently, multivariate regression equations are presented that incorporate a larger number of exogenous variables as independent variables, including the physician and practice characteristics used to examine workload data (Table 5). The endogenous variables for the analysis are those that indicate what transpired during the encounter, including the time spent with the patient, the diagnostic tests and therapeutic procedures utilized, and so forth. In the regression analysis, selected endogenous variables are designated as dependent variables and regressed against the independent variables noted above.

## A Note on the Use of Inferential Statistics

The outpatient/inpatient encounter data provided by physicians in the sample actually constitute a cluster sample, as they are "clustered" within the practices of certain physicians (the respondents) rather than having been drawn randomly from among all the encounters that occurred between renal physicians and their patients during the study week. Cluster samples are widely employed in health surveys and are unavoidable in physician-centered surveys of patient care, but they result in standard errors that are greater than those that would have been obtained from a simple random sample of the same size.[16] This type of design effect multiplies the value of the standard error by a factor of from 1.0 to a (practical) maximum of 2.0 in surveys such as the one reported here.[17] Since commonly-available statistical software packages calculate standard errors based on the assumption of a simple random sample, and do not permit independent entry of adjusted standard errors, the analysis reported here will simply adopt a statistical significance (Alpha) level of .01 as the minimum level required to indicate a significant difference among means or mean percentages.* This more rigorous alpha level will serve to correct for the design effects that result from the use of a cluster sample, and will ensure that the reported findings are not artifactual.

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*In each of the data exhibits for this analysis, the actual significance level will be reported for both significant and non-significant differences. Significance levels less than .001 (highly significant) are shown as .000.

## Bivariate Analysis

Table 53 shows mean encounter times in minutes, the mean number of visits with the physician during the previous six months, and the mean number of problems (written diagnoses) recorded by the physician, broken down by the patient/encounter characteristics enumerated previously: Patient age, race/ethnicity, type of dialysis, and encounter location. The statistical significance of these mean values across categories is determined by means of the analysis of variance. As shown in the table, patient age does not differentiate either time or number of visits, although the other three variables do show significant results. For race/ethnicity, the most time is spent with non-Hispanic whites, combined with fewer visits than for the other major racial/ethnic categories. Type of dialysis shows a generally reciprocal relationship between encounter times and numbers of visits, with in-center dialysis patients (center or facility) having the greatest number of visits combined with the briefest encounter times. Finally, the encounter location distribution in Table 53 shows brief encounter times for outpatient dialysis unit rounds, somewhat longer times for inpatient dialysis rounds, and much greater encounter times for locations other than the dialysis unit.

The number of problems (diagnoses) recorded by the physician is 1.81 for all ESRD patients, and differs significantly as a function of all four patient encounter characteristics shown in Table 53. For patient age, there is a clear continuum in the number of problems

IME PER ENCOUNTER, NUMBER OF VISITS AND NUMBER OF PROBLEMS
ECORDED BY PATIENT/ENCOUNTER CHARACTERISTICS (ESRD PATIENTS)[1]

| unter tic | Case-Base (N) | Time in Minutes $\overline{X}$ | Number of Visits in Last 6 Months $\overline{X}$ | Number of Problems (diagnoses) Recorded $\overline{X}$ |
|---|---|---|---|---|
| | 6164 | 9.7 | 39.6 | 1.81 |
| | 138 | 9.7 | 38.6 | 1.66 |
| | 1304 | 9.4 | 39.0 | 1.77 |
| | 2450 | 9.5 | 38.5 | 1.81 |
| er | 2228 | 9.8 | 41.2 | 1.85 |
| *al Significance* | -- | *.681* | *.017* | *.001* |
| /Ethnicity | | | | |
| -Hispanic) | 3493 | 10.6 | 38.2 | 1.84 |
| -Hispanic) | 2007 | 8.3 | 40.7 | 1.77 |
| | 488 | 8.1 | 44.8 | 1.72 |
| acific Islander | 122 | 10.0 | 44.5 | 1.74 |
| ndian/Alaskan Native | 30 | 9.2 | 37.8 | 1.70 |
| *al Significance* | -- | *.000* | *.000* | *.000* |
| lysis | | | | |
| based Hemodialysis | 2419 | 10.3 | 43.6 | 1.86 |
| ing Facility Hemo- s | 3105 | 7.7 | 40.8 | 1.73 |
| dialysis | 112 | 14.9 | 12.2 | 1.88 |
| | 309 | 18.7 | 19.5 | 2.00 |
| | 219 | 15.1 | 22.6 | 2.00 |
| *al Significance* | -- | *.000* | *.000* | *.000* |
| ocation | | | | |
| OPD/Clinic | 285 | 19.8 | 14.2 | 1.86 |
| t Dialysis Unit | 4075 | 6.4 | 46.9 | 1.74 |
| Dialysis Unit | 556 | 10.9 | 35.6 | 1.87 |
| | 1203 | 17.0 | 24.0 | 2.01 |
| | 33 | 35.2 | 19.7 | 2.00 |
| *al Significance* | -- | *.000* | *.000* | *.000* |

---

cal significance is determined by menas of the analysis of
.

encounter locations include the emergency room, the patient's
d nursing homes.

recorded, with the mean number significantly higher for older patients. The number of problems is also significantly higher for white (non-Hispanic) patients, for those on peritoneal dialysis, and for those seen in hospital and "other" locations.

Tables 54 and 55 show rates of use of leading diagnostic tests and patient education/counseling therapies by patient and encounter characteristics. Data presented in these tables were abstracted from large contingency tables (the study instrument permitted the recording of 48 types of diagnostic tests and 43 therapeutic procedures) and do not incorporate tests of significance. (Subsequent tables [57-60] present complete contingency tables utilizing the chi-square test of signficance.) The tables do not indicate any consistent differences based on age or race/ethnicity (except for more patient education/counseling for the small [N=30] American Indian/Alaskan native group in Table 55) but show higher rates of blood chemistries and cultures for peritoneal dialysis patients* (CAPD, IPD, and CCPD) and for hospital and "other" encounter locations, and greater levels of patient education and counseling for office visits.

Tables 56 through 60 examine effects of patient and encounter characteristics on the complexity of the services provided, the severity and urgency of the patient's problem, and whether an additional

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*Higher numbers of tests for certain categories of patients (e.g., CAPD) may reflect greater proportions of new patients within these categories.

## TABLE 54. LEADING DIAGNOSTIC TESTS BY PATIENT/ENCOUNTER CHARACTERISTICS (ESRD PATIENTS)[1]

| Patient/Encounter Characteristic | Diagnostic Test (Percentage of Encounters Where Used) | | | | | |
|---|---|---|---|---|---|---|
| | Blood Chemistry % | Routine Lab: CBC, Urinalysis % | Automated Panel (e.g. SMA-12) % | Chest X-Ray % | ECG % | Culture % |
| Total | 21.9 | 20.1 | 13.7 | 5.5 | 4.1 | 3.4 |
| Patient Age | | | | | | |
| 0-20 | 19.6 | 19.6 | 11.2 | 4.2 | 1.4 | 2.1 |
| 21-40 | 22.4 | 19.8 | 14.2 | 4.6 | 3.0 | 3.3 |
| 41-60 | 21.6 | 20.0 | 14.2 | 5.5 | 3.3 | 3.9 |
| 61 or older | 21.8 | 20.1 | 12.7 | 5.9 | 5.5 | 2.9 |
| Patient Race/Ethnicity | | | | | | |
| White (non-Hispanic) | 22.7 | 21.7 | 15.4 | 6.5 | 5.1 | 3.5 |
| Black (non-Hispanic) | 21.0 | 18.2 | 12.1 | 4.0 | 2.5 | 3.3 |
| Hispanic | 23.0 | 19.2 | 10.4 | 5.0 | 4.0 | 3.0 |
| Asian or Pacific Islander | 16.0 | 18.3 | 4.6 | 3.8 | 4.6 | 3.8 |
| American Indian/Alaskan Native | 9.4 | 15.6 | 15.6 | 3.1 | 3.1 | 3.1 |
| Type of Dialysis | | | | | | |
| Hospital-based Hemodialysis | 22.3 | 21.8 | 13.8 | 5.6 | 4.6 | 2.5 |
| Freestanding Facility Hemodialysis | 18.0 | 16.1 | 11.2 | 4.4 | 3.1 | 2.4 |
| Home Hemodialysis | 33.1 | 38.1 | 31.4 | 16.9 | 11.0 | 2.5 |
| CAPD | 43.3 | 36.5 | 28.2 | 10.9 | 5.8 | 17.3 |
| IPD/CCPD | 39.6 | 26.1 | 17.1 | 5.9 | 6.3 | 9.0 |
| Encounter Location | | | | | | |
| Office or OPD/Clinic | 18.2 | 35.4 | 35.1 | 11.0 | 11.0 | 5.2 |
| Outpatient Dialysis Unit | 16.1 | 15.2 | 9.8 | 1.5 | 1.5 | 1.4 |
| Inpatient Dialysis Unit | 28.1 | 24.1 | 17.0 | 10.4 | 6.5 | 6.0 |
| Hospital | 39.7 | 31.4 | 19.8 | 14.6 | 9.5 | 8.6 |
| Other[2] | 34.3 | 34.3 | 22.9 | 40.0 | 31.4 | 5.7 |

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[1] Statistical tests were not applied to the large contingency tables (172-240 cells) from which these data were drawn.

[2] "Other" encounter locations include the emergency room, the patient's home, and nursing homes.

PATIENT EDUCATION AND COUNSELING THERAPY BY PATIENT/ENCOUNTER CHARACTERISTICS (ESRD PATIENTS)[1]

| | Therapeutic Procedure (Percentage of Encounters Where Used) | | | | | |
|---|---|---|---|---|---|---|
| counter ristic | Therapeutic Listening/ Reassurance % | Patient Education % | Diet Prescription % | Family/ Social/ Sexual Counseling % | Exercise/ Activity Prescription % | Patient Dialysis Training % |
| | 15.3 | 9.3 | 7.7 | 3.2 | 3.2 | 1.5 |
| ge | | | | | | |
| | 11.9 | 11.2 | 7.0 | 4.9 | 0.0 | 0.7 |
| | 16.4 | 9.8 | 6.7 | 3.4 | 2.7 | 1.6 |
| | 15.0 | 9.5 | 7.8 | 3.2 | 2.4 | 1.6 |
| lder | 15.1 | 8.6 | 8.3 | 3.0 | 4.4 | 1.4 |
| ace/Ethnicity | | | | | | |
| non-Hispanic) | 16.8 | 10.1 | 9.0 | 3.8 | 4.1 | 1.8 |
| non-Hispanic) | 12.2 | 8.5 | 5.3 | 2.5 | 1.9 | 0.9 |
| c | 17.6 | 8.0 | 9.2 | 2.4 | 2.0 | 0.4 |
| r Pacific Islander | 15.3 | 3.1 | 6.1 | 0.8 | 3.1 | 3.8 |
| n Indian/Alaskan e | 21.9 | 25.0 | 15.6 | 9.4 | 3.1 | 12.5 |
| ialysis | | | | | | |
| l-based ialysis | 16.8 | 8.1 | 8.3 | 2.9 | 4.5 | 1.4 |
| nding Facility ialysis | 14.0 | 9.3 | 6.7 | 3.1 | 2.2 | 0.9 |
| modialysis | 22.0 | 14.4 | 17.8 | 6.8 | 5.9 | 4.2 |
| | 15.7 | 17.6 | 10.9 | 5.4 | 2.6 | 5.8 |
| D | 12.2 | 8.6 | 7.2 | 3.2 | 0.9 | 5.0 |
| Location | | | | | | |
| or OPD/Clinic | 19.6 | 24.4 | 15.8 | 5.5 | 7.6 | 5.5 |
| ent Dialysis Unit | 16.7 | 8.5 | 6.3 | 2.6 | 2.1 | 0.8 |
| nt Dialysis Unit | 13.4 | 11.4 | 8.4 | 3.9 | 4.9 | 4.0 |
| l | 10.2 | 7.4 | 10.4 | 4.2 | 4.8 | 1.7 |
| | 17.1 | 8.6 | 8.6 | 8.6 | 5.7 | 2.9 |

---

ical tests were not applied to the large contingency tables 0 cells) from which these data were drawn.

' encounter locations include the emergency room, the patient's and nursing homes.

visit is scheduled or a referral/consultation obtained. Patient age has a statistically significant effect only on the severity of the problem (Table 57) with 20% of problems of patients 61 or older assessed as "severe" compared to 15-16% for younger ESRD patients.

The complexity of care, as well as the severity and urgency of the patient's problems, differ by race/ethnicity. The Hispanic, Asian/Pacific, and American Indian groups tend to receive more "extended" plus "comprehensive" care (Table 56), possibly reflecting greater numbers of physical examinations among these groups. Hispanics have the lowest proportion of "severe" problems (Table 57) and the lowest incidence of emergent problems ("should have seen sooner" and "emergency" in Table 58).

Finally, both dialysis type and encounter location tend to affect each of the parameters of care included in this series of tables (except that encounter location does not affect "next contact" in Table 59). Dialysis unit care generally tends to involve the least complex, severe, or urgent care, but there are differences by facility type, with patients on hospital-based center dialysis more likely to receive extended or comprehensive care (Table 56). Whereas there is little difference in "next contact" (Table 59) given that ESRD patients are bound to be seen again in some location, Table 60 shows pronounced differences in referral/consultation rates, with higher rates for all types of peritoneal dialysis patients, and for those on home hemodialysis.

TABLE 56. COMPLEXITY OF SERVICE BY PATIENT/ENCOUNTER CHARACTERISTICS (ESRD PATIENTS)[1]

| Patient/Encounter Characteristic | Complexity of Service Minimal % | Brief % | Limited % | Extended % | Comprehensive % | Total % |
|---|---|---|---|---|---|---|
| Total | 27.5 | 30.8 | 26.7 | 11.6 | 3.5 | 100.0 |
| **Patient Age** | | | | | | |
| 0-20 | 33.8 | 29.6 | 24.6 | 9.2 | 2.8 | 100.0 |
| 21-40 | 29.5 | 27.7 | 24.9 | 14.2 | 3.7 | 100.0 |
| 41-60 | 27.8 | 30.9 | 27.4 | 10.5 | 3.3 | 100.0 |
| 61 or older | 25.8 | 32.6 | 27.0 | 11.2 | 3.4 | 100.0 |
| *Statistical Significance =* | *.006* | | | | | |
| **Patient Race/Ethnicity** | | | | | | |
| White (non-Hispanic) | 24.7 | 29.8 | 29.3 | 12.1 | 4.2 | 100.0 |
| Black (non-Hispanic) | 31.3 | 34.3 | 23.2 | 8.8 | 2.4 | 100.0 |
| Hispanic | 31.7 | 27.4 | 22.2 | 16.5 | 2.3 | 100.0 |
| Asian or Pacific Islander | 22.6 | 21.8 | 33.9 | 16.1 | 5.6 | 100.0 |
| American Indian/Alaskan Native | 40.6 | 18.8 | 21.9 | 15.6 | 3.1 | 100.0 |
| *Statistical Significance =* | *.000* | | | | | |
| **Type of Dialysis** | | | | | | |
| Hospital-based Hemodialysis | 23.4 | 29.5 | 30.2 | 13.2 | 3.8 | 100.0 |
| Freestanding Facility Hemodialysis | 34.6 | 34.6 | 21.4 | 7.3 | 2.1 | 100.0 |
| Home Hemodialysis | 7.7 | 14.5 | 44.4 | 24.8 | 8.5 | 100.0 |
| CAPD | 4.2 | 16.5 | 38.8 | 27.5 | 12.9 | 100.0 |
| IPD/CCPD | 14.4 | 19.4 | 37.8 | 25.2 | 3.2 | 100.0 |
| *Statistical Significance =* | *.000* | | | | | |
| **Encounter Location** | | | | | | |
| Office or OPD/Clinic | 6.9 | 21.5 | 43.1 | 23.6 | 4.9 | 100.0 |
| Outpatient Dialysis Unit | 36.5 | 36.6 | 20.1 | 6.5 | 0.3 | 100.0 |
| Inpatient Dialysis Unit | 23.8 | 24.9 | 30.4 | 16.7 | 4.3 | 100.0 |
| Hospital | 3.6 | 16.6 | 44.3 | 22.7 | 12.9 | 100.0 |
| Other[2] | 8.8 | 5.9 | 17.6 | 44.1 | 23.5 | 100.0 |
| *Statistical Significance =* | *.000* | | | | | |

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[1] Statistical significance determined by means of the chi-square test.

[2] "Other" encounter locations include the emergency room, the patient's home, and nursing homes.

TABLE 57. SEVERITY OF PROBLEM BY PATIENT/ENCOUNTER CHARACTERISTICS (ESRD PATIENTS)[1]

| Patient/Encounter Characteristic | Degree of Severity | | | | |
|---|---|---|---|---|---|
| | None % | Minor % | Moderate % | Severe % | Total % |
| Total | 18.4 | 27.1 | 37.0 | 17.6 | 100.0 |
| Patient Age | | | | | |
| 0-20 | 24.1 | 21.3 | 39.0 | 15.6 | 100.0 |
| 21-40 | 20.7 | 26.8 | 37.2 | 15.4 | 100.0 |
| 41-60 | 18.7 | 27.6 | 37.3 | 16.4 | 100.0 |
| 61 or Older | 16.2 | 27.3 | 36.2 | 20.2 | 100.0 |
| *Statistical Significance = .000* | | | | | |
| Patient Race/Ethnicity | | | | | |
| White (non-Hispanic) | 17.4 | 28.3 | 36.8 | 17.5 | 100.0 |
| Black (non-Hispanic) | 19.4 | 26.8 | 35.2 | 18.7 | 100.0 |
| Hispanic | 21.6 | 22.5 | 43.6 | 12.4 | 100.0 |
| Asian or Pacific Islander | 17.9 | 23.5 | 43.0 | 15.4 | 100.0 |
| American Indian/Alaskan Native | 15.6 | 25.1 | 40.7 | 18.8 | 100.0 |
| *Statistical Significance = .000* | | | | | |
| Type of Dialysis | | | | | |
| Hospital-based Hemodialysis | 17.1 | 26.7 | 33.9 | 22.3 | 100.0 |
| Freestanding Facility Hemodialysis | 22.2 | 29.2 | 36.6 | 11.9 | 100.0 |
| Home Hemodialysis | 6.0 | 18.9 | 56.9 | 18.1 | 100.0 |
| CAPD | 2.9 | 16.5 | 51.9 | 28.5 | 100.0 |
| IPD/CCPD | 6.3 | 20.3 | 45.5 | 28.0 | 100.0 |
| *Statistical Significance = .000* | | | | | |
| Encounter Location | | | | | |
| Office or OPD/Clinic | 6.6 | 21.2 | 57.3 | 14.9 | 100.0 |
| Outpatient Dialysis Unit | 24.5 | 33.5 | 29.2 | 12.9 | 100.0 |
| Inpatient Dialysis Unit | 16.1 | 17.9 | 45.7 | 20.4 | 100.0 |
| Hospital | 1.6 | 11.7 | 54.7 | 32.0 | 100.0 |
| Other[2] | 5.9 | 8.8 | 41.2 | 44.1 | 100.0 |
| *Statistical Significance = .000* | | | | | |

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[1] Statistical significance determined by means of the chi-square test.

[2] "Other" encounter locations include the emergency room, the patient's home, and nursing homes.

TABLE 58. URGENCY OF PROBLEM BY PATIENT/ENCOUNTER CHARACTERISTICS (ESRD PATIENTS)[1]

| Patient/Encounter Characteristic | Degree of Urgency | | | | | |
|---|---|---|---|---|---|---|
| | None % | Could Have Been Deferred % | Needed To See Today % | Should Have Seen Sooner % | Emergency % | Total % |
| Total | 21.6 | 14.3 | 60.9 | 1.2 | 2.0 | 100.0 |
| Patient Age | | | | | | |
| 0-20 | 27.9 | 12.9 | 57.9 | 0.0 | 1.4 | 100.0 |
| 21-40 | 23.1 | 13.8 | 60.1 | 1.4 | 1.7 | 100.0 |
| 41-60 | 22.2 | 14.9 | 60.0 | 1.2 | 1.7 | 100.0 |
| 61 or older | 20.0 | 14.2 | 62.3 | 1.1 | 2.4 | 100.0 |
| *Statistical Significance = .191* | | | | | | |
| Patient Race/Ethnicity | | | | | | |
| White (non-Hispanic) | 20.5 | 14.7 | 61.2 | 1.2 | 2.4 | 100.0 |
| Black (non-Hispanic) | 21.8 | 14.7 | 61.1 | 1.0 | 1.4 | 100.0 |
| Hispanic | 28.6 | 10.3 | 59.3 | 0.6 | 1.2 | 100.0 |
| Asian or Pacific Islander | 21.1 | 15.4 | 56.1 | 4.9 | 2.4 | 100.0 |
| American Indian/Alaskan Native | 31.3 | 9.4 | 56.3 | 3.1 | 0.0 | 100.0 |
| *Statistical Significance = .000* | | | | | | |
| Type of Dialysis | | | | | | |
| Hospital-based Hemodialysis | 20.3 | 11.2 | 65.1 | 1.3 | 2.2 | 100.0 |
| Freestanding Facility Hemodialysis | 24.8 | 17.7 | 55.0 | 0.9 | 1.6 | 100.0 |
| Home Hemodialysis | 10.3 | 14.7 | 71.6 | 0.9 | 2.6 | 100.0 |
| CAPD | 10.7 | 10.0 | 73.1 | 2.3 | 3.9 | 100.0 |
| IPD/CCPD | 11.3 | 7.2 | 76.6 | 2.7 | 2.3 | 100.0 |
| *Statistical Significance = .000* | | | | | | |
| Encounter Location | | | | | | |
| Office or OPD/Clinic | 15.3 | 26.0 | 54.5 | 1.7 | 2.4 | 100.0 |
| Outpatient Dialysis Unit | 28.2 | 16.4 | 54.1 | 0.8 | 0.5 | 100.0 |
| Inpatient Dialysis Unit | 16.6 | 12.0 | 68.2 | 1.3 | 2.0 | 100.0 |
| Hospital | 3.3 | 5.7 | 83.0 | 2.1 | 6.0 | 100.0 |
| Other[2] | 5.9 | 2.9 | 47.1 | 5.9 | 38.2 | 100.0 |
| *Statistical Significance = .000* | | | | | | |

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[1] Statistical significance determined by means of the chi-square test.

[2] "Other" encounter locations include the emergency room, the patient's home, and nursing homes.

TABLE 59. NEXT CONTACT BY PATIENT/ENCOUNTER CHARACTERISTICS (ESRD PATIENTS)[1]

| Patient/Encounter Characteristic | Further Contact Planned[2] | | |
|---|---|---|---|
| | Yes % | No % | Total % |
| Total | 97.7 | 2.3 | 100.0 |
| Patient Age | | | |
| 0-20 | 98.6 | 1.4 | 100.0 |
| 21-40 | 97.2 | 2.8 | 100.0 |
| 41-60 | 97.5 | 2.5 | 100.0 |
| 61 or older | 98.1 | 1.9 | 100.0 |
| *Statistical Significance = .261* | | | |
| Patient Race/Ethnicity | | | |
| White (non-Hispanic) | 97.9 | 2.1 | 100.0 |
| Black (non-Hispanic) | 97.1 | 2.9 | 100.0 |
| Hispanic | 98.0 | 2.0 | 100.0 |
| Asian or Pacific Islander | 98.4 | 1.6 | 100.0 |
| American Indian/Alaskan Native | 100.0 | 0.0 | 100.0 |
| *Statistical Significance = .244* | | | |
| Type of Dialysis | | | |
| Hospital-based Hemodialysis | 97.9 | 2.1 | 100.0 |
| Freestanding Facility Hemodialysis | 97.6 | 2.4 | 100.0 |
| Home Hemodialysis | 99.1 | 0.9 | 100.0 |
| CAPD | 100.0 | 0.0 | 100.0 |
| IPD/CCPD | 92.3 | 7.7 | 100.0 |
| *Statistical Significance = .000* | | | |
| Encounter Location | | | |
| Office or OPD/Clinic | 99.3 | 0.7 | 100.0 |
| Outpatient Dialysis Unit | 97.5 | 2.5 | 100.0 |
| Inpatient Dialysis Unit | 97.5 | 2.5 | 100.0 |
| Hospital | 98.0 | 2.0 | 100.0 |
| Other[3] | 100.0 | 0.0 | 100.0 |
| *Statistical Significance = .215* | | | |

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[1] Statistical significance determined by means of the chi-square test.

[2] Further contact includes telephone follow-up, as well as outpatient and inpatient visits and dialysis rounds.

[3] "Other" encounter locations include the emergency room, the patient's home, and nursing home.

TABLE 60. REFERRAL/CONSULTATION BY PATIENT/ENCOUNTER CHARACTERISTICS (ESRD PATIENTS)[1]

| Patient/Encounter Characteristic | Referral/Consultation[2] Yes % | No % | Total % |
|---|---|---|---|
| Total | 8.8 | 91.2 | 100.0 |
| Patient Age | | | |
| 0-20 | 8.6 | 91.4 | 100.0 |
| 21-40 | 9.2 | 90.8 | 100.0 |
| 41-60 | 8.2 | 91.8 | 100.0 |
| 61 or older | 9.1 | 90.9 | 100.0 |
| *Statistical Significance = .683* | | | |
| Patient Race/Ethnicity | | | |
| White (non-Hispanic) | 9.2 | 90.8 | 100.0 |
| Black (non-Hispanic) | 9.1 | 90.9 | 100.0 |
| Hispanic | 5.2 | 94.8 | 100.0 |
| Asian or Pacific Islander | 9.1 | 90.9 | 100.0 |
| American Indian/Alaskan Native | 3.1 | 96.9 | 100.0 |
| *Statistical Significance = .044* | | | |
| Type of Dialysis | | | |
| Hospital-based Hemodialysis | 9.1 | 90.9 | 100.0 |
| Freestanding Facility Hemodialysis | 7.0 | 93.0 | 100.0 |
| Home Hemodialysis | 19.8 | 80.2 | 100.0 |
| CAPD | 15.9 | 84.1 | 100.0 |
| IPD/CCPD | 16.3 | 83.7 | 100.0 |
| *Statistical Significance = .000* | | | |
| Encounter Location | | | |
| Office or OPD/Clinic | 13.6 | 86.4 | 100.0 |
| Outpatient Dialysis Unit | 4.0 | 96.0 | 100.0 |
| Inpatient Dialysis Unit | 15.0 | 85.0 | 100.0 |
| Hospital | 21.4 | 78.6 | 100.0 |
| Other[3] | 12.5 | 87.5 | 100.0 |
| *Statistical Significance = .000* | | | |

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[1] Statistical significance determined by means of the chi-square test.

[2] Includes referrals to medical and surgical specialists for either care or consultation.

[3] "Other" encounter locations include the emergency room, the patient's home, and nursing homes.

## Multivariate Analysis

In order to statistically "explain" the care provided to ESRD patients, four variables that measure actions taken by the physician in the course of the patient encounter were entered into multivariate regression equations. As shown in Table 61, these variables (the "dependent" variables) are the time the physician spends with the patient, the number of diagnostic tests and therapeutic procedures he or she orders or performs, and the complexity of the services provided. Two types of independent variables are utilized in the multivariate analysis: The patient/encounter characteristics employed in the bivariate analysis (Tables 53-60) plus a measure of the number of problems (written diagnoses) the physician recorded for the patient, and selected physician/practice characteristics from among those initially presented in Table 5.*

The multivariate analysis is a "structural" type of analysis in the sense that it attempts to explain variation in the physician's actions without reference to how ill the patient is or exactly what his or her problems are in addition to having ESRD. Because the complex etiologic and diagnostic data elicited as part of the patient encounter recording process do not easily lend themselves to translation into the numerical values necessary for entry into a regression equation,* we are making the heuristic assumption of "all else being equal," meaning that there is no relationship between the patient's clinical status (what additional problems he or she has, and how serious those problems are) and the independent variables entered into the equation. Since we know from Tables 57 and 58 that the severity and urgency of problems are significantly related to several of these variables, the assumption is questionable at best; yet we will adopt it in order to conduct this exploratory analysis of parameters of ESRD care.

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*Table 61 does not incorporate all of the physician/practice characteristics shown in Table 5. These include primary specialty (as board certification serves as a more objective indicator of specialization than does self-designated specialty), geographic region (as regional variation in patterns of care would most likely be a spurious finding), and a number of characteristics deemed more relevant to aggregate workload data than to patterns of patient care: director of dialysis facility, affiliation with a dialysis chain, number of dialysis patients per group physician, and practice incorporation.

In Table 61, three of the dependent variables (time, diagnostic tests, and therapeutic procedures) are interval-level measures; thus 9.65 is the average encounter time in minutes, and the average patient encounter involves the use of 0.84 diagnostic tests. Complexity of service is coded on an arbitrary scale of from 1 (minimal) to 5 (comprehensive); a large body of methodological research has shown that such ordinal-level measures can be entered into multivariate

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*Nominal-level variables with large numbers of categories, such as the 15-category "renal disease etiology" variable or the 3- and 4-digit classifications of ICD-9-CM that represent the physician's diagnoses cannot readily be entered as dummy variables into a regression equation, yet these are precisely the variables that could be used to detect the kinds of pre-existing or comorbid conditions that would be indicative of the kinds of serious problems that could potentially complicate treatment of an ESRD patient. Additional analyses that incorporate selected "indices" derived from the etiological and diagnostic data into multivariate regression equations are presented in the next section of this report.

## 61. REGRESSION OF SELECTED PATIENT ENCOUNTER CHARACTERISTICS: VARIABLES ENTERED INTO THE REGRESSION (ESRD PATIENTS)[1]

| able | Mean | Standard Deviation | Number of Cases |
|---|---|---|---|
| PENDENT VARIABLES | | | |
| Per Encounter | 9.65 | 10.90 | 6164 |
| er of Diagnostic Tests | 0.84 | 1.30 | 6411 |
| er of Therapeutic ocedures | 0.98 | 1.21 | 6411 |
| lexity of Service | 2.33 | 1.10 | 6297 |
| TIENT/ENCOUNTER CHARACTERISTICS | | | |
| ent Age | 53.37 | 15.69 | 6361 |
| Ethnicity (Ref: White, n-Hispanic) | | | |
| ack Patient* | 0.34 | 0.47 | 6411 |
| spanic Patient* | 0.08 | 0.27 | 6411 |
| sian/American Indian* | 0.03 | 0.16 | 6411 |
| ysis Modality (Ref: Hospital enter Hemodialysis) | | | |
| reestanding Facility Hemodialysis* | 0.50 | 0.50 | 6411 |
| ome Hemodialysis* | 0.02 | 0.13 | 6411 |
| APD* | 0.05 | 0.22 | 6411 |
| PD/CCPD* | 0.03 | 0.18 | 6411 |
| ounter Location (Ref: ialysis Unit) | | | |
| ffice or OPD/Clinic* | 0.05 | 0.21 | 6411 |
| ospital Encounter* | 0.19 | 0.40 | 6411 |
| ther (ER, Nursing Home) Locations* | 0.01 | 0.07 | 6411 |
| ber of Problems Recorded | 1.81 | 0.70 | 6231 |
| HYSICIAN/PRACTICE CHARACTERISTICS | | | |
| ctice Arrangement (Ref: Solo) | | | |
| Group Practice* | 0.59 | 0.49 | 6411 |
| Institutional Practice* | 0.37 | 0.48 | 6411 |
| ysician Age | 41.19 | 6.44 | 5984 |
| ard Certification (Ref: Nephrology Board) | | | |
| Internal Medicine Board* | 0.25 | 0.43 | 6411 |

1. (continued)

| e | Mean | Standard Deviation | Number of Cases |
|---|---|---|---|
| ard Certification* | 0.13 | 0.34 | 6411 |
| litan/Non-Metropolitan ice (Ref: Metropolitan) | | | |
| etropolitan Practice* | 0.03 | 0.17 | 6411 |
| of Dialysis Facilities | 2.18 | 1.03 | 6266 |
| sement for Dialysis (Ref: nate Method) | | | |
| or Service Reimbursement* | 0.12 | 0.32 | 6411 |
| f Dialysis Facility (Ref: wner) | | | |
| ity Owner* | 0.15 | 0.36 | 6411 |
| of Dialysis Stations | 20.21 | 10.62 | 6114 |
| of Dialysis Patients | 71.61 | 54.27 | 6114 |
| Workload | 147.66 | 64.58 | 6037 |

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:isks (*) indicate nominal-level (categorical) characteristics
esented in the regression equations by dummy variables. Reference
gories for each set of dummy variables are shown in parentheses.

statistical analyses without unduly biasing their results.[18] There are two interval-level patient/encounter characteristics: Patient age and number of problems recorded. The remaining variables are nominal-level variables coded in the form of "dummy" variables. The use of dummy variables in regression equations is based on the fact that dichotomous variables (e.g., those that are coded either zero or one) are interval-level measures. Therefore, the categories of a nominal-level measure can each be coded a zero (if an individual case does not fit into that category) or a one (if it does), as long as one category is left uncoded. This latter category is referred to as the "reference category," and results of the regression equations can be interpreted as deviations from that category. For the patient/encounter characteristics, the reference categories for the three sets of dummy variables describe an encounter with a white (non-Hispanic) patient who receives hemodialysis treatment at a hospital-based center, and is being seen in that dialysis unit. Means for the dummy variables for each reference category show the proportions of encounters that fall into the particular category--e.g., the 0.34 for "black" in Table 61 means that 34% of the encounters are with black patients.*

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*Some of these values will differ slightly from the desccriptive patient encounter data reported earlier due to the pairwise deletion of cases with missing values from the regression analysis.

The entry of physician/practice characteristics into this analysis required the elaboration of the patient encounter computer file through the addition of selected physician demographic data to the case-file of every patient encounter that the physician recorded. As with the patient/encounter variables, these characteristi constitute a mix of interval-level variables and nominal categories transformed into dummy variables. In this case, though, the means shown in Table 61 will not correspond to other data presented in this report since an individual physician's data is in effect "weighted' by the number of ESRD patients seen. The result is that the means shown represent the distribution of care accounted for by physicians in a given category rather than a distribution of physicians.

The reference categories for the five sets of dummy variables describe a physician who is a board-certified nephrologist in solo practice, who is located in a metropolitan area, does not own a dialysis facility, and is reimbursed under the alternate (capitation) plan.

Table 62 presents the regression of time per encounter against the patient/encounter and physician/practice variables enumerated above. Following the criteria set forth above, each of the variables shown in the table is statistically significant at the .01 level ($F < 6.63$ at 1 + 5613 degrees of freedom), as is the regression equation as a whole. Because of the mix of interval-level and dummy variables, the constant of 12.89 minutes is not readily interpret as it refers to a dialysis encounter with a white patient by a board certified nephrologist, etc. (the reference categories noted

RESSION OF TIME PER ENCOUNTER (ESRD PATIENTS)[1]

| | B | Beta | Cumulative R Square |
|---|---|---|---|
| unter | 8.50 | 0.31 | 0.110 |
| /Clinic | 11.04 | 0.21 | 0.168 |
| ons | 27.64 | 0.19 | 0.205 |
| oad | -0.03 | -0.16 | 0.237 |
| Facility is | -1.70 | -0.08 | 0.247 |
| alysis Patients | -0.01 | -0.05 | 0.251 |
| l Practice | -0.91 | -0.04 | 0.253 |
| roblems Recorded | 0.65 | 0.04 | 0.255 |
| | 2.20 | 0.04 | 0.257 |
| ialysis Stations | -0.04 | -0.04 | 0.259 |
| nt | -0.82 | -0.04 | 0.260 |
| | 12.89 | | |

---

nce categories for dummy variable regression are a white (non-
ic) patient on hospital center hemodialysis, being treated in a
is unit (outpatient or inpatient) by a board-certified nephrologist
o practice, who is located in a metropolitan area, does not own
ysis facility, and is reimbursed under the alternate (capitation)
Regression equations and variables listed are all significant;
fore F values and significance levels are not presented.

above), but the reference category for the interval-level measures (workload, number of dialysis patients, number of problems, etc.) is the "intercept" value of zero. The deviations from this hypothetical constant, however, are readily interpretable by means of the "B" (unstandardized regression coefficient) column. A hospital encounter "adds" 8.51 minutes, an office visit 11.09, and a visit in any other location 27.62. Conversely, there is a negative impact on mean patient encounter times by workload-type variables: Weekly workload, number of dialysis patients, and number of dialysis stations.

The "beta" (standardized regression coefficients) column shows the impact of each variable on encounter time when both the dependent and independent variables are standardized with a variance of one. Betas are not interpretable in terms of meaningful values of the dependent variable (as are the B coefficients) but they show the relative impact of different independent variables on time. Clearly, patient encounters that occur outside of the dialysis unit consume more time; the betas are relatively high and together the three dummy variables account of 20% of the variance in time. Weekly workload accounts for an additional 4% of the variance, and the significant predictors collectively account for 26%

Table 63 shows the regression of diagnostic tests against the same set of variables. Here the constant for the hypothetical reference group is 0.32 tests per encounter, with hospital encounters adding 0.76 extra tests to this mean. Workload-type variables exert a downward influence on the use of diagnostic tests, as do

TABLE 63. REGRESSION OF DIAGNOSTIC TESTS (ESRD PATIENTS)[1]

| Variable | B | Beta | Cumulative R Square |
|---|---|---|---|
| Hospital Encounter | 0.76 | 0.23 | 0.081 |
| Number of Problems Recorded | 0.30 | 0.16 | 0.113 |
| Office or OPD/Clinic | 0.54 | 0.09 | 0.128 |
| Other Encounter Location | 1.36 | 0.08 | 0.135 |
| Weekly Workload | <-0.01 | -0.08 | 0.141 |
| Institutional Practice | -0.19 | -0.07 | 0.146 |
| CAPD | 0.42 | 0.07 | 0.151 |
| Home Hemodialysis | 0.48 | 0.05 | 0.153 |
| Group Practice | 0.14 | 0.06 | 0.155 |
| Number of Dialysis Patients | <-0.01 | -0.06 | 0.157 |
| Number of Dialysis Facilities | 0.07 | 0.05 | 0.159 |
| Freestanding Facility Hemodialysis | -0.14 | -0.05 | 0.161 |
| Internal Medicine Board | 0.12 | 0.04 | 0.162 |
| (Constant) | 0.29 | | |

---

[1] Reference categories for dummy variable regression are a white (non-Hispanic) patient on hospital center hemodialysis, being treated in a dialysis unit (outpatient or inpatient) by a board-certified nephrologist in solo practice, who is located in a metropolitan area, does not own a dialysis facility, andis reimbursed under the alternate (capitation) plan. Regression equations and variables listed are all significant; therefore F values and significance levels are not presented.

encounters in free-standing facilities (i.e., encounters in free-standing dialysis units involve 0.12 fewer tests per visit than do encounters in hospital-based centers even when all other significant sources of variation in testing are controlled for). The number of problems recorded (the study coded up to three written diagnoses noted by the physician) would presumably be an important factor in the use of diagnostic tests, but accounts for just 3% of the variation in testing when the effects of other variables (notably, the patient being in the hospital) are controlled for.

Table 64 shows that a substantial number of variables are statistically significant predictors of the use of therapeutic procedures, but also shows that the number of problems recorded is by far the most important factor. The number of problems adds 0.36 procedures to the constant of 0.26, has the largest beta, and accounts for 6% of the variance, even with "hospital encounter" in the equation. Also notable in the table is the significant negative impact of fee-for-service reimbursement. Although reimbursement actually accounts for less than 1% of the variation in procedure usage when analyzed in conjunction with the other variables, the fairly sizable negative coefficients (B and beta) associated with this variable show that physicians reimbursed on a fee-for-service basis employ significantly fewer procedures than do their colleagues reimbursed under the alternate plan.

Finally, Table 65 shows that the complexity of service for the dialysis unit reference group is fairly low (constant = 1.22),

TABLE 64. REGRESSION OF THERAPEUTIC PROCEDURES (ESRD PATIENTS)[1]

| Variable | B | Beta | Cumulative R Square |
|---|---|---|---|
| Number of Problems Recorded | 0.36 | 0.21 | 0.064 |
| Hospital Encounter | 0.38 | 0.12 | 0.086 |
| Office or OPD/Clinic | 0.51 | 0.09 | 0.099 |
| Freestanding Facility Hemodialysis | -0.16 | -0.06 | 0.108 |
| No Board Certification | 0.25 | 0.07 | 0.116 |
| Fee for Service Reimbursement | -0.28 | -0.07 | 0.123 |
| Institutional Practice | -0.20 | -0.08 | 0.128 |
| Black Patient | -0.10 | -0.04 | 0.131 |
| Number of Dialysis Facilities | -0.07 | -0.06 | 0.133 |
| CAPD | 0.35 | 0.06 | 0.136 |
| Home Hemodialysis | 0.54 | 0.06 | 0.139 |
| Physician Age | 0.01 | 0.05 | 0.141 |
| Number of Dialysis Stations | -0.01 | -0.05 | 0.143 |
| Non-Metropolitan Practice | -0.40 | -0.06 | 0.146 |
| Other Encounter Location | 0.76 | 0.05 | 0.148 |
| Number of Dialysis Patients | <-0.01 | -0.04 | 0.149 |
| Dialysis Facility Owner | 0.12 | 0.04 | 0.150 |
| (Constant) | 0.29 | | |

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[1] Reference categories for dummy variable regression are a white (non-Hispanic) patient on hospital center hemodialysis, being treated in a dialysis unit (outpatient or inpatient) by a board-certified nephrologist in solo practice, who is located in a metropolitan area, does not own a dialysis facility, and is reimbursed under the alternate (capitation) plan. Regression equations and variables listed are all significant; therefore F values and significance levels are not presented.

TABLE 65. REGRESSION OF COMPLEXITY OF SERVICE (ESRD PATIENTS)[1]

| Variable | B | Beta | Cumulative R Square |
|---|---|---|---|
| Hospital Encounter | 1.01 | 0.36 | 0.167 |
| Office or OPD/Clinic | 0.79 | 0.15 | 0.198 |
| Freestanding Facility Hemodialysis | -0.29 | -0.13 | 0.220 |
| No Board Certification | 0.26 | 0.08 | 0.237 |
| Number of Problems Recorded | 0.18 | 0.11 | 0.251 |
| Other Encounter Location | 1.48 | 0.10 | 0.262 |
| Institutional Practice | -0.25 | -0.11 | 0.269 |
| Physician Age | 0.02 | 0.10 | 0.276 |
| Group Practice | -0.26 | -0.12 | 0.284 |
| Number of Dialysis Facilities | 0.08 | 0.08 | 0.289 |
| Black Patient | -0.13 | -0.05 | 0.293 |
| Dialysis Facility Owner | 0.18 | 0.06 | 0.296 |
| CAPD | 0.30 | 0.06 | 0.299 |
| Non-Metropolitan Practice | 0.36 | 0.06 | 0.302 |
| (Constant) | 1.22 | | |

---

[1] Reference categories for dummy variable regression are a white (non-Hispanic) patient on hospital center hemodialysis, being treated in a dialysis unit (outpatient or inpatient) by a board-certified nephrologist in solo practice, who is located in a metropolitan area, does not own a dialysis facility, and is reimbursed under the alternate (capitation) plan. Regression equations and variables listed are all significant; therefore F values and significance levels are not presented.

and is influenced mainly by hospital or office encounter location, which account for 20% of the variance. The complexity noted by the physician is also affected by the number of problems recorded (1% of the variance) and by other factors that collectively account for 30% of the variance in complexity of service.

## DIALYSIS TYPE AND CASE-MIX ANALYSIS*

The analysis of outpatient/inpatient encounter data that was set forth in the previous chapter sought to examine variation in what transpired during an encounter between a physician and an ESRD patient ("what was done" for the patient) as a function of selected patient/encounter characteristics (patient age, patient race/ethnicity, type of dialysis, and encounter location), and also sought to "explain" as much of the variance in the care provided as possible, using a variety of patient and physician characteristics. Although guided by such pivotal criteria as the selection of the four types of patient/encounter characteristics enumerated above as criterion variables and the designation of four parameters of care (encounter time, diagnostic tests, therapeutic procedures, and complexity of service) as dependent variables in the regression equations, the analysis has up to this point been "exploratory" in nature--attempting to uncover factors that account for significant variation in care provided for the ESRD patient. On the basis, in part, of the findings reported thus far, as well as the findings of other studies of care for ESRD, the researchers sought to expand the analysis of outpatient/inpatient encounter data in order to address questions related to differences in the patient populations treated by different types of renal dialysis and the question of the potential impact of certain "high-risk" patients on the parameters of care listed above. Finally, we sought to determine whether there were discernible differences among categories of renal physicians with regard to the degree to which they provide care for high-risk patients. Findings from each of these three areas of the dialysis type and case-mix analysis are outlined below.

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*This supplemental analysis of the outpatient/inpatient encounter data from the ESRD study was made possible through an extension of USC's original grant.

### Dialysis Type, Case Mix and Patient Survival Risk Factors

The findings presented in Tables 53 through 60 (above) incorporate dialysis type as one of four criterion variables used to disaggregate a variety of patient encounter data. Whereas each of the other three criterion variables fails to show statistically significant differences on at least one patient encounter variable, it is notable that dialysis type exerts a significant (and often substantial) impact upon virtually every aspect of a patient encounter, from the number of visits in the previous six months to the diagnostic tests employed during the visit. The demonstration of clinical differences in care as a function of the type of maintenance dialysis has prompted this analysis of case-mix differences in patient care. Specifically, answers were sought to the following two study questions. (1) Are there significant differences in the patient populations for different types of dialysis care (e.g., are there differences in patient demographics, such as age); in particular are hospital-based dialysis centers caring for more "high-risk" patients than are freestanding facilities? (2) What are the differences in both patient characteristics and frequency of non-routine treatments for self-care patients, and between those on home hemodialysis and CAPD?

The data for this analysis are presented in a series of descriptive tables, followed by an inferential analysis in which discrete variables are transformed into a number of case-mix indices and subjected to tests of statistical significance. The descriptive tables (Tables 66 through 77) present data on the renal disease etiology for ESRD patients, and on patient diagnosis, patient age, patient race/ethnicity, the location of patient encounters and a measure of the type of care provided (e.g., "primary" versus other types of care). For each variable, two tables are utilized--the first presenting the distribution of the criterion variable as a function of dialysis type, and the second distributing dialysis type as a function of the criterion variable. Subsequent inferential tables (Tables 78 through 80) measure the significance of case-mix differences across dialysis type, and introduce statistical controls for possible exogenous sources of variation in case-mix. In each case, the analysis presents separate data for continuous cycling peritoneal dialysis (which was combined with IPD in previous analyses); even though the low case-base for CCPD (N=48) results in frequency distributions in which individual percentages are based on very few patients, the substantial differences in the patient populations on IPD and CCPD documented in the following tables necessitate the presentation of separate data for these two types of peritoneal dialysis.

Table 66 presents the distribution of renal disease etiology (from Table 41) by dialysis type. The table shows pronounced differences in etiology distributions across the six dialysis modalities. Among the largest etiological categories, primary hypertensive disease

TABLE 66. DISTRIBUTION OF RENAL DISEASE ETIOLOGY BY DIALYSIS TYPE (ESRD PATIENTS)[1]

| | HEMODIALYSIS | | | PERITONEAL DIALYSIS | | | |
|---|---|---|---|---|---|---|---|
| Renal Disease Etiology | HOSPITAL-BASED CENTER (N=2530) % | FREE-STANDING FACILITY (N=3229) % | HOME (N=118) % | CAPD (N=312) % | IPD (N=174) % | CCPD[2] (N=48) % | TOTAL (N=6411) % |
| Primary hypertensive disease (Nephrosclerosis, benign or malignant) | 24.9 | 31.1 | 20.3 | 18.7 | 33.9 | 14.6 | 27.7 |
| Glomerulonephritis | 24.8 | 23.0 | 33.9 | 21.3 | 6.3 | 25.0 | 23.4 |
| Diabetic nephropathy | 17.5 | 17.0 | 9.3 | 29.7 | 30.5 | 39.6 | 18.2 |
| Polycystic kidney disease | 6.7 | 5.7 | 14.4 | 11.0 | 6.3 | 4.2 | 6.6 |
| Collagen vascular disease | 2.6 | 2.9 | 5.9 | 1.0 | 1.1 | 2.1 | 2.7 |
| Hereditary interstitial nephritis | 0.8 | 1.1 | 3.4 | 1.0 | 0.0 | 0.0 | 0.9 |
| Analgesic abuse nephropathy | 1.1 | 1.6 | 0.0 | 0.3 | 0.6 | 0.0 | 1.3 |
| Other interstitial nephritis (Including pyelonephritis) | 5.8 | 5.5 | 5.9 | 5.5 | 4.6 | 4.2 | 5.6 |
| Obstructive uropathy, acquired | 2.9 | 1.8 | 0.0 | 0.0 | 2.9 | 6.3 | 2.2 |
| Obstructive uropathy, congenital | 1.2 | 0.9 | 1.7 | 0.6 | 1.1 | 0.0 | 1.1 |
| Amyloidosis | 0.4 | 0.2 | 0.8 | 1.3 | 0.0 | 0.0 | 0.3 |
| Multiple myeloma | 0.8 | 0.5 | 0.0 | 2.6 | 0.0 | 0.0 | 0.7 |
| Gouty nephropathy | 0.6 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 |
| Other or unknown etiology | 9.9 | 8.4 | 4.2 | 7.1 | 12.6 | 4.2 | 8.9 |
| TOTAL | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

[1] Distribution of dialysis type by renal disease etiology (i.e., horizontal percentage distributions from the table above) is shown in Table 67.

[2] Individual percentages in distributions with small numbers of encounters may be unreliable and should be interpreted with caution.

the former and latter groups must be made with caution.*

Table 67 presents the distribution of dialysis type by renal disease etiology. Here, the over or underrepresentation of a particular dialysis type among patients with a given renal disease etiology can be determined by comparing the column for that etiology with the "total" column on the second page of the table. This comparison shows that patients with an etiology of analgesic abuse, nephropathy, hereditary insterstitial nephritis, primary hypertensive disease and collagen vascular disease are overrepresented in freestanding facilities vis-a-vis hospital based centers.. Conversely, obstructive uropathy (acquired or congenital) is overrepresented among patients at hospital-based centers. Finally, comparing self-care patients on home hemodialysis and CAPD, the table shows that patients with diabetic nephropathy are overrepresented among CAPD patients, whereas those with collagen vascular disease are overrepresented among home hemodialysis patients.

Tables 68 and 69 present the combined percentages of the primary, secondary and tertiary written diagnoses recorded by the physician (see Tables 50-52). Table 68 shows the 20 leading diagnoses by dialysis type, whereas Table 69 is restricted to the 10 leading diagnoses.

The percentages in Table 68 sum to more than 100%, since an average of 1.81 diagnoses were recorded for ESRD patients (Table 53).

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*This caveat applies to the descriptive data presented in Tables 66 through 77. In the inferential analysis presented in Tables 78 through 80, statistical controls are introduced that minimize the bias inherent in encounter-based patient data.

TABLE 67. DISTRIBUTION OF DIALYSIS TYPE BY RENAL DISEASE ETIOLOGY (ESRD PATIENTS)[1]

| Type of Dialysis | RENAL DISEASE ETIOLOGY<br>PRIMARY HYPERTENSIVE DISEASE (N=1729) | GLOMERULO-NEPHRITIS (N=1459) | DIABETIC NEPHROPATHY (N=1137) | POLYCYSTIC KIDNEY DISEASE (N=409) | COLLAGEN VASCULAR DISEASE (N=169) | HEREDITARY INTERSTITIAL NEPHRITIS (N=59) | ANALGESIC ABUSE NEPHROPATHY (N=79) |
|---|---|---|---|---|---|---|---|
| | % | % | % | % | % | % | % |
| Hemodialysis | | | | | | | |
| Hospital-Based Center | 36.0 | 42.5 | 36.8 | 41.1 | 38.5 | 32.2 | 34.2 |
| Freestanding Facility | 55.4 | 48.7 | 46.0 | 43.3 | 53.8 | 55.9 | 63.3 |
| Home | 1.4 | 2.7 | 1.0 | 4.2 | 4.1 | 6.8 | 0.0 |
| Peritoneal Dialysis | | | | | | | |
| CAPD | 3.4 | 4.5 | 8.1 | 8.3 | 1.8 | 5.1 | 1.3 |
| IPD | 3.4 | 0.8 | 4.7 | 2.7 | 1.2 | 0.0 | 1.3 |
| CCPD | 0.4 | 0.8 | 1.7 | 0.5 | 0.6 | 0.0 | 0.0 |
| TOTAL | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

[1] This table corresponds to Table 66 which shows the distribution of renal disease etiology by dialysis type.

[2] Individual percentages in distributions with small numbers of encounters may be unreliable and should be interpreted with caution.

TABLE 67. (CONTINUED)[1]

| Type of Dialysis | OTHER INTERSTITIAL NEPHRITIS (N=349) % | OBSTRUCTIVE UROPATHY, ACQUIRED (N=137) % | OBSTRUCTIVE UROPATHY, CONGENITAL (N=66) % | AMYLOIDOSIS (N=20)[2] % | MULTIPLE MYELOMA (N=44)[2] % | GOUTY NEPH-ROPATHY (N=25)[2] % | OTHER OR UNKNOWN ETIOLOGY (N=556) % | TOTAL (N=6238) % |
|---|---|---|---|---|---|---|---|---|
| Hemodialysis | | | | | | | | |
| Hospital-Based Center | 41.8 | 53.5 | 47.0 | 50.0 | 45.5 | 60.0 | 44.4 | 39.5 |
| Freestanding Facility | 48.8 | 40.9 | 43.9 | 25.0 | 36.4 | 40.0 | 46.4 | 50.4 |
| Home | 2.0 | 0.0 | 3.0 | 5.0 | 0.0 | 0.0 | 0.9 | 1.8 |
| Peritoneal Dialysis | | | | | | | | |
| CAPD | 4.9 | 0.0 | 3.0 | 20.0 | 18.2 | 0.0 | 4.0 | 4.9 |
| IPD | 2.3 | 3.6 | 3.0 | 0.0 | 0.0 | 0.0 | 4.0 | 2.7 |
| CCPD | 0.6 | 2.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 0.7 |
| TOTAL | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

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[1] This table corresponds to Table 66 which shows the distribution of renal disease etiology by dialysis type.

[2] Individual percentages in distributions with small numbers of encounters may be unreliable and should be interpreted with caution.

TABLE 68. DISTRIBUTION OF PATIENT DIAGNOSES BY DIALYSIS TYPE (ESRD PATIENTS)[1]

| | HEMODIALYSIS | | | PERITONEAL DIALYSIS | | | |
|---|---|---|---|---|---|---|---|
| Diagnosis | HOSPITAL-BASED CENTER (N=2530) % | FREE-STANDING FACILITY (N=3229) % | HOME (N=118) % | CAPD (N=312) % | IPD (N=174) % | CCPD[2] (N=48) % | TOTAL % |
| Chronic Renal Failure | 55.4 | 48.6 | 41.5 | 39.1 | 38.5 | 41.7 | 50.4 |
| Hypertensive Renal Disease | 19.6 | 22.3 | 15.3 | 16.0 | 17.8 | 8.3 | 20.6 |
| Diabetes Mellitus | 13.4 | 13.9 | 5.9 | 23.4 | 27.6 | 27.1 | 14.5 |
| Chronic Glomeruloneophritis | 11.8 | 13.8 | 13.6 | 9.0 | 4.0 | 6.3 | 12.4 |
| Nephritis/Nephropathy, not specified as acute or chronic | 11.8 | 8.7 | 8.5 | 13.5 | 20.7 | 14.6 | 10.5 |
| Congenital anomalies of urinary system | 4.5 | 3.8 | 5.1 | 9.3 | 6.3 | 4.2 | 4.4 |
| Renal Failure, unspecified | 4.7 | 3.1 | 2.5 | 2.2 | 5.2 | 0.0 | 3.7 |
| Complications due to certain procedures | 3.8 | 3.3 | 9.3 | 4.2 | 4.6 | 0.0 | 3.7 |
| Other chronic ischemic heart disease | 3.8 | 3.0 | 5.1 | 4.5 | 5.2 | 0.0 | 3.5 |
| Heart Failure | 1.7 | 3.4 | 2.5 | 2.6 | 8.0 | 2.1 | 2.8 |

[1] Frequency distributions combine primary, secondary, and tertiary problems, based on the physician's written diagnoses, coded in International Classification of Disease, Ninth Edition, Clinical Modification. Since more than one diagnosis could be noted for each patient, percentages sum to more than 100%. Following the procedure adopted in Tables 50-52, the leading 20 diagnoses are shown. Table 69, which shows the distribution of dialysis type by diagnosis, is limited to the 10 leading diagnoses.

[2] Individual percentages in distributions with small numbers of encounters may be unreliable and should be interpreted with caution.

TABLE 68. (CONTINUED)

| Diagnosis | HEMODIALYSIS |  |  | PERITONEAL DIALYSIS |  |  |  |
|---|---|---|---|---|---|---|---|
|  | HOSPITAL-BASED CENTER (N=2530) % | FREE-STANDING FACILITY (N=3229) % | HOME (N=118) % | CAPD (N=312) % | IPD (N=174) % | CCPD[2] (N=48) % | TOTAL % |
| Other disorders of urethra and urinary tract | 2.6 | 2.0 | 0.0 | 0.0 | 1.1 | 0.0 | 2.1 |
| Other unspecified anemias | 1.7 | 1.6 | 3.4 | 1.9 | 0.0 | 0.0 | 1.7 |
| Chronic obstructive pulmonary disease | 1.7 | 1.1 | 4.2 | 2.9 | 0.6 | 6.3 | 1.5 |
| Infections of kidney | 1.1 | 1.6 | 0.8 | 1.3 | 1.1 | 0.0 | 1.4 |
| Erythematous conditions | 1.5 | 1.2 | 1.7 | 0.3 | 0.0 | 0.0 | 1.3 |
| Peritonitis | 0.2 | 0.2 | 0.0 | 15.4 | 4.0 | 18.8 | 1.2 |
| Angina Pectoris | 1.3 | 1.1 | 0.0 | 1.3 | 0.0 | 0.0 | 1.2 |
| Disorders of fluid, electrolyte and acid-base balance | 1.0 | 1.2 | 0.8 | 1.0 | 1.1 | 0.0 | 1.1 |
| Depressive disorder | 1.1 | 0.9 | 5.9 | 1.0 | 0.6 | 0.0 | 1.1 |
| Septicemia | 1.5 | 0.7 | 0.0 | 0.6 | 1.7 | 0.0 | 1.0 |

[1] Frequency distributions combine primary, secondary, and tertiary problems, based on the physician's written diagnoses, coded in International Classification of Disease, Ninth Edition, Clinical Modification. Since more than one diagnosis could be noted for each patient, percentages sum to more than 100%. Following the procedure adopted in Tables 50-52, the leading 20 diagnoses are shown. Table 69, which shows the distribution of dialysis type by diagnosis, is limited to the 10 leading diagnoses.

[2] Individual percentages in distributions with small numbers of encounters may be unreliable and should be interpreted with caution.

TABLE 69. DISTRIBUTION OF DIALYSIS TYPE BY PATIENT DIAGNOSIS (ESRD PATIENTS)[1]

|  | DIAGNOSIS |  |  |  |  |  |
|---|---|---|---|---|---|---|
| Type of Dialysis | CHRONIC RENAL FAILURE (N=3228) % | HYPERTENSIVE RENAL DISEASE (N=1319) % | DIABETES MELLITUS (N=931) % | CHRONIC GLOMERULO-NEPHRITIS (N=798) % | NEPHRITIS/ NEPHROPATHY, ACUTE OR CHRONIC (N=675) % | CONGENITAL ANOMALIES OF URINARY SYSTEM (N=283) % |
| Hemodialysis |  |  |  |  |  |  |
| Hospital-Based Center | 43.4 | 37.5 | 36.5 | 37.3 | 44.1 | 39.9 |
| Freestanding Facility | 48.6 | 54.7 | 48.3 | 55.9 | 41.8 | 43.1 |
| Home | 1.5 | 1.4 | 0.8 | 2.0 | 1.5 | 2.1 |
| Peritoneal Dialysis |  |  |  |  |  |  |
| CAPD | 3.8 | 3.8 | 7.8 | 3.5 | 6.2 | 10.2 |
| IPD | 2.1 | 2.4 | 5.2 | 0.9 | 5.3 | 3.9 |
| CCPD | 0.6 | 0.3 | 1.4 | 0.4 | 1.0 | 0.7 |
| TOTAL | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

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[1] Patient diagnoses combine primary, secondary, and tertiary problems based on the physician's written diagnoses, coded in International Classification of Diseases, Ninth Edition, Clinical Modification. This table corresponds to Table 68, but incorporates only the 10 leading diagnoses. The case-base (N) for columns in this table differ from other tables in this series, as they are based on total numbers of diagnoses rather than on patients; the 6,411 patients with end-stage renal disease had a total of 11,265 written diagnoses, for an average of 1.8 diagnoses per patient.

TABLE 69. (CONTINUED)

|  | DIAGNOSIS |  |  |  |  |
|---|---|---|---|---|---|
| Type of Dialysis | RENAL FAILURE, UNSPECIFIED (N=240) % | COMPLICATIONS DUE TO PROCEDURES (N=235) % | OTHER CHRONIC ISCHEMIC HEART DISEASE (N=223) % | HEART FAILURE (N=179) % | TOTAL (N=11265) % |
| Hemodialysis |  |  |  |  |  |
| Hospital-Based Center | 50.0 | 40.4 | 43.5 | 23.5 | 39.5 |
| Freestanding Facility | 42.1 | 46.0 | 43.5 | 62.0 | 50.4 |
| Home | 1.3 | 4.7 | 2.7 | 1.7 | 1.8 |
| Peritoneal Dialysis |  |  |  |  |  |
| CAPD | 2.9 | 5.5 | 6.3 | 4.5 | 4.9 |
| IPD | 3.8 | 3.4 | 4.0 | 7.8 | 2.7 |
| CCPD | 0.0 | 0.0 | 0.0 | 0.6 | 0.7 |
| TOTAL | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

[1] Patient diagnoses combine primary, secondary, and tertiary problems based on the physician's written diagnoses, coded in International Classification of Diseases, Ninth Edition, Clinical Modification. This table corresponds to Table 68, but incorporates only the 10 leading diagnoses. The case-base (N) for columns in this table differ from other tables in this series, as they are based on total numbers of diagnoses rather than on patients; the 6,411 patients with end-stage renal disease had a total of 11,265 written diagnoses, for an average of 1.8 diagnoses per patient.

The table shows that "chronic renal failure" (or "ESRD") was noted in just over half of the encounters with ESRD patients. The proportion of patients with hypertensive renal disease is slightly greater for freestanding facilities than for hospital-based centers, but the percentages are lower than for the primary hypertensive disease etiology (Table 66), probably reflecting both cases of controlled hypertension and a certain amount of underreporting via the written diagnosis. Diabetes mellitus is noted more frequently for peritoneal dialysis patients (again, at lower levels than the diabetic nephropathy etiology in Table 66), and peritoneal dialysis patients have substantial levels of peritonitis (second page of Table 68). Finally, home hemodialysis patients are presenting with elevated percentages of certain disorders: anemias, COPD, and depression (second page of the table). Table 69 shows that the diagnosis "congenital anomalies of the urinary system" is overrepresented among patients on CAPD, and heart disease ("other chronic ischemic heart disease" and "heart failure") is substantially overrepresented among patients on IPD.

Tables 70 and 71 show age distributions of ESRD patients by ten-year intervals. IPD has the oldest mean patient age (57.5 years) and this is reflected in the skewed distribution shown in Table 70. The mean age for patients at hospital-based centers is 54.5, and that for freestanding facilities is 1-1/2 years lower, at 53.0. Finally, the mean ages for self-care dialysis patients (home hemodialysis, CAPD and CCPD) are identical or virtually so--48.9, 48.7 and 48.9 (respectively). In Table 71, the distributions of dialysis type

## TABLE 70. DISTRIBUTION OF PATIENT AGE BY DIALYSIS TYPE (ESRD PATIENTS)[1]

| Patient Age | HEMODIALYSIS | | | PERITONEAL DIALYSIS | | | |
|---|---|---|---|---|---|---|---|
| | HOSPITAL-BASED CENTER (N=2530) % | FREE-STANDING FACILITY (N=3229) % | HOME (N=118) % | CAPD (N=312) % | IPD (N=174) % | CCPD[2] (N=48) % | TOTAL (N=6411) % |
| 0-9 | 0.1 | 0.4 | 0.0 | 0.6 | 1.8 | 0.0 | 0.3 |
| 10-19 | 1.7 | 1.2 | 0.0 | 0.3 | 0.0 | 0.0 | 1.3 |
| 20-29 | 7.1 | 6.5 | 6.0 | 11.3 | 5.3 | 10.4 | 7.0 |
| 30-39 | 11.5 | 12.1 | 18.8 | 15.9 | 8.8 | 8.3 | 12.1 |
| 40-49 | 12.9 | 16.6 | 24.8 | 18.8 | 9.9 | 27.1 | 15.3 |
| 50-59 | 20.7 | 22.6 | 25.6 | 24.9 | 17.5 | 33.3 | 22.0 |
| 60-69 | 26.8 | 27.7 | 21.4 | 20.7 | 32.7 | 16.7 | 26.9 |
| 70-79 | 15.9 | 11.3 | 3.4 | 7.1 | 22.2 | 2.1 | 13.0 |
| 80-89 | 3.2 | 1.4 | 0.0 | 0.3 | 1.8 | 2.1 | 2.0 |
| 90 or older | 0.1 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 |
| TOTAL | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

[1] Distribution of dialysis type by patient age (i.e., horizontal percentage distributions from the table above) is shown in Table 71.

[2] Individual percentages in distributions with small numbers of encounters may be unreliable and should be interpreted with caution.

TABLE 71. DISTRIBUTION OF DIALYSIS TYPE BY PATIENT AGE (ESRD PATIENTS)[1]

| | PATIENT AGE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Type of Dialysis | 0-9 (N=19)[2] % | 10-19 (N=83) % | 20-29 (N=444) % | 30-39 (N=767) % | 40-49 (N=974) % | 50-59 (N=1397) % | 60-69 (N=1712) % | 70-79 (N=828) % | 80-89 (N=130) % | 90 or older[2] (N=7) % | Total (N=6361) % |
| Hemodialysis | | | | | | | | | | | |
| Hospital-Based Center | 10.5 | 50.6 | 40.3 | 37.7 | 33.3 | 37.1 | 39.2 | 48.2 | 60.8 | 28.6 | 39.5 |
| Freestanding Facility | 63.2 | 48.2 | 47.1 | 50.6 | 54.7 | 52.0 | 51.9 | 44.0 | 35.4 | 71.4 | 50.4 |
| Home | 0.0 | 0.0 | 1.6 | 2.9 | 3.0 | 2.1 | 1.5 | 0.5 | 0.0 | 0.0 | 1.8 |
| Peritoneal Dialysis | | | | | | | | | | | |
| CAPD | 10.5 | 1.2 | 7.9 | 6.4 | 6.0 | 5.5 | 3.7 | 2.7 | 0.8 | 0.0 | 4.9 |
| IPD | 15.8 | 0.0 | 2.0 | 2.0 | 1.7 | 2.1 | 3.3 | 4.6 | 2.3 | 0.0 | 2.7 |
| CCPD | 0.0 | 0.0 | 1.1 | 0.5 | 1.3 | 1.1 | 0.5 | 0.1 | 0.8 | 0.0 | 0.7 |
| TOTAL | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

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[1] This table corresponds to Table 70 which shows the distribution of renal disease etiology by dialysis type.

[2] Individual percentages in distributions with small numbers of encounters may be unreliable and should be interpreted with caution.

show that the slight difference in mean ages between center and facility hemodialysis masks a pattern in which the centers appear to be caring for both older and younger patients in disproportionate numbers. Ignoring the youngest and oldest age groups (both of which have a small case base) it is notable that both the 10-19 and 80-89 age groups are overrepresented in hospital centers compared to facilities, and that the 20-29 and 70-79 age groups show the same trend (albeit at a diminished level).

Tables 72 and 73 show a distinctive racial composition of patient populations undergoing different types of renal dialysis. Non-Hispanic whites are overrepresented on self-care dialysis (home hemodialysis, CAPD and CCPD) and in hospital-based centers. Blacks are disproportionately likely to be on IPD, and both blacks and Hispanics are more likely to dialyze in freestanding facilities than in hospital centers.* The substantial differences in both renal disease etiology (Table 66) and race/ethnicity (Table 72) by dialysis type prompted an analysis of the etiology differences controlling for race. This analysis for hemodialysis (Table 98) and peritoneal dialysis (Table 99) are shown in the Appendix. Because of the small size of some of the racial/ethnic groups (see Table 73), the comparison is restricted to whites versus blacks.

The results of the analysis of the effects of racial composition

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*The overrepresentation of blacks and Hispanics in freestanding dialysis facilities may be a function of the physical location of such facilities vis-a-vis the location of hospital dialysis centers.

TABLE 72. DISTRIBUTION OF RACE/ETHNICITY BY DIALYSIS TYPE (ESRD PATIENTS)

| | HEMODIALYSIS | | | PERITONEAL DIALYSIS | | | |
|---|---|---|---|---|---|---|---|
| Race/Ethnicity | HOSPITAL-BASED CENTER (N=2530) % | FREE-STANDING FACILITY (N=3229) % | HOME (N=118) % | CAPD (N=312) % | IPD (N=174) % | CCPD[1] (N=48) % | TOTAL % |
| White, Non-Hispanic | 62.8 | 47.8 | 79.7 | 75.7 | 50.6 | 77.1 | 56.0 |
| Black, Non-Hispanic | 29.2 | 38.8 | 15.3 | 19.7 | 45.3 | 14.6 | 33.7 |
| Hispanic | 4.6 | 11.1 | 2.5 | 3.6 | 4.1 | 6.3 | 7.8 |
| Asian or Pacific Islander | 2.6 | 1.8 | 2.5 | 1.0 | 0.0 | 0.0 | 2.1 |
| American Indian or Alaskan Native | 0.7 | 0.4 | 0.0 | 0.0 | 0.0 | 2.1 | 0.5 |
| TOTAL | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

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[1] Individual percentages in distributions with small numbers of encounters may be unreliable and should be interpreted with caution.

TABLE 73. DISTRIBUTION OF DIALYSIS TYPE BY RACE/ETHNICITY (ESRD PATIENTS)

| Type of Dialysis | White, Non-Hispanic (N=3574) | Black, Non-Hispanic (N=2150) | Hispanic (N=499) | Asian or Pacific Islander (N=131) | American Indian or Alaskan Native (N=32)[1] | Total (N=6386) |
|---|---|---|---|---|---|---|
| | % | % | % | % | % | % |
| Hemodialysis | | | | | | |
| Hospital-Based Center | 44.2 | 34.2 | 23.2 | 50.4 | 53.1 | 39.5 |
| Freestanding Facility | 43.2 | 58.2 | 71.9 | 45.0 | 43.8 | 50.4 |
| Home | 2.6 | 0.8 | 0.6 | 2.3 | 0.0 | 1.8 |
| Peritoneal Dialysis | | | | | | |
| CAPD | 6.5 | 2.8 | 2.2 | 2.3 | 0.0 | 4.9 |
| IPD | 2.4 | 3.6 | 1.4 | 0.0 | 0.0 | 2.7 |
| CCPD | 1.0 | 0.3 | 0.6 | 0.0 | 3.1 | 0.7 |
| TOTAL | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

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[1] Individual percentages in distributions with small numbers of encounters may be unreliable and should be interpreted with caution.

on renal disease etiology show that there are substantial effects of race as well as some independent effects by dialysis type. This is illustrated by the following data on rates of primary hypertensive disease (abstracted from Table 98):

| | PERCENTAGE OF PATIENTS WITH PRIMARY HYPERTENSIVE DISEASE | |
|---|---|---|
| | Hospital-Based Hemodialysis % | Freestanding Hemodialysis % |
| Whites | 18.7 | 21.8 |
| Blacks | 39.7 | 48.5 |

Clearly, black ESRD patients have primary hypertensive disease as a renal disease etiology more than twice as frequently as whites in either hemodialysis location. Thus, the higher rates of this etiology in freestanding facilities are at least in part a function of the greater proportion of blacks. At the same time, there is an effect independent of race, as whites have a 17% higher rate and blacks a 22% higher rate of this etiology in freestanding facilities.* (See the Appendix for a further discussion of Tables 98 and 99.)

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*The degree of interpretation one can attach to these differences, however, is limited by the inability to differentiate between controlled and uncontrolled hypertension. Although the data in Table 68 suggest that 78.7% of the cases with a hypertension etiology in hospital centers are of sufficient concern to warrant a written diagnosis of hypertensive renal disease (19.6% divided by 24.9% from Table 66), the comparable figure for freestanding facilities is 71.7%.

The data presented in Tables 74 and 75 ilustrate the point raised above concerning the comparability of encounter-based data for patients on center/facility hemodialysis versus those on self-care dialysis. In Table 74 the data show that whereas hospital inpatients account for about 12-20% of encounters with patients on center facility hemodialysis, they account for up to 60% of encounters with self-care patients. A notable feature of the table is the difference in rates of inpatient care (inpatient dialysis plus hospital inpatient) for center versus facility hemodialysis; hospital-based centers have 32.6% of ESRD patient encounters in inpatient settings compared to 17.4% for freestanding facilities.

The final set of descriptive tables (Tables 76 and 77) utilize the primary care classification (depicted in Figure 1 and shown in Table 39) to differentiate the care provided to patients on the several types of dialysis. As discussed previously in the text accompanying Figure 1, the algorithm utilizes a number of discrete patient encounter variables to characterize the type of care being provided. One type of care--principal care--incorporates most of the features of "primary care." Episodic care describes an encounter in which those features are absent, whereas specialized care involves seeing a regular patient for a limited (specialized) treatment only. The remaining types of care differentiated by the algorithm are first encounters and consultations. As shown in Tables 76 and 77, the great majority of encounters with ESRD patients fall into the "principal" category, but this category is lowest for freestanding facility hemodialysis,

TABLE 74. DISTRIBUTION OF ENCOUNTER LOCATION BY DIALYSIS TYPE (ESRD PATIENTS)

| | HEMODIALYSIS | | | PERITONEAL DIALYSIS | | | |
|---|---|---|---|---|---|---|---|
| Encounter Location | HOSPITAL-BASED CENTER (N=2530) % | FREE-STANDING FACILITY (N=3229) % | HOME (N=118) % | CAPD (N=312) % | IPD (N=174) % | CCPD[1] (N=48) % | TOTAL % |
| Office, OPD/Clinic | 1.4 | 4.3 | 31.4 | 21.6 | 4.0 | 10.4 | 4.5 |
| Outpatient Dialysis | 65.6 | 77.8 | 8.5 | 15.2 | 20.2 | 18.8 | 66.6 |
| Inpatient Dialysis | 13.1 | 5.5 | 12.7 | 5.5 | 15.0 | 8.3 | 8.9 |
| Hospital Inpatient | 19.5 | 11.9 | 46.6 | 56.8 | 59.0 | 60.4 | 19.4 |
| Other[2] | 0.5 | 0.5 | 0.8 | 1.0 | 1.7 | 2.1 | 0.5 |
| TOTAL | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

[1] Individual percentages in distributions with small numbers of encounters may be unreliable and should be interpreted with caution.

[2] The "other" category includes 27 encounters with ESRD patients in the emergency room, 4 in extended care facilities, 1 at home, and 3 in other locations.

TABLE 75. DISTRIBUTION OF DIALYSIS TYPE BY ENCOUNTER LOCATION (ESRD PATIENTS)

| | ENCOUNTER LOCATION | | | | | |
|---|---|---|---|---|---|---|
| Type of Dialysis | OFFICE, OPD/CLINIC (N=291) % | OUTPATIENT DIALYSIS (N=4264) % | INPATIENT DIALYSIS (N=569) % | HOSPITAL INPATIENT (N=1240) % | OTHER[1] (N=35)[2] % | TOTAL (N=6399) % |
| Hemodialysis | | | | | | |
| Hospital-Based Center | 12.0 | 38.8 | 58.0 | 39.8 | 34.3 | 39.5 |
| Freestanding Facility | 48.1 | 58.8 | 31.1 | 31.0 | 42.9 | 50.4 |
| Home | 12.7 | 0.2 | 2.6 | 4.4 | 2.9 | 1.8 |
| Peritoneal Dialysis | | | | | | |
| CAPD | 23.0 | 1.1 | 3.0 | 14.2 | 8.6 | 4.9 |
| IPD | 2.4 | 0.8 | 4.6 | 8.2 | 8.6 | 2.7 |
| CCPD | 1.7 | 0.2 | 0.7 | 2.3 | 2.9 | 0.7 |
| TOTAL | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

[1] The "other" category includes 27 encounters with patients in the emergency room, 4 in extended care facilities, 1 at home, and 3 in other locations.

[2] Individual percentages in distributions with small numbers of encounters may be unreliable and should be interpreted with caution.

TABLE 76. DISTRIBUTION OF PRIMARY CARE CLASSIFICATION BY DIALYSIS TYPE (ESRD PATIENTS)[1]

| Type of Care | HEMODIALYSIS<br>HOSPITAL BASED CENTER (N=2530) % | FREE-STANDING FACILITY (N=3229) % | HOME (N=118) % | PERITONEAL DIALYSIS<br>CAPD (N=312) % | IPD (N=174) % | CCPD[2] (N=48) % | TOTAL (N=6411) % |
|---|---|---|---|---|---|---|---|
| First Encounters | 0.8 | 1.5 | 0.0 | 2.3 | 0.0 | 2.2 | 1.2 |
| Episodic Encounters | 1.7 | 2.4 | 0.0 | 1.9 | 12.1 | 0.0 | 2.3 |
| Principal Care Encounters | 89.0 | 77.7 | 94.0 | 88.3 | 78.6 | 91.3 | 83.1 |
| Consultations | 2.9 | 5.3 | 5.1 | 5.2 | 9.2 | 4.3 | 4.5 |
| Specialized Care | 5.6 | 13.0 | 0.9 | 2.3 | 0.0 | 2.2 | 8.9 |
| TOTAL | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

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[1] The patient care classification utilizes several patient encounter variables to characterize the type of care being provided, as shown in Figure 1. "Principal care" incorporates most of the characteristics commonly associated with primary care. The distribution of dialysis type by primary care classification is shown in Table 77.

[2] Individual percentages in distributions with small numbers of encounters may be unreliable and should be interpreted with caution.

TABLE 77. DISTRIBUTION OF DIALYSIS TYPE BY PRIMARY CARE CLASSIFICATION (ESRD PATIENTS)[1]

| Type of Dialysis | TYPE OF CARE | | | | | |
|---|---|---|---|---|---|---|
| | FIRST ENCOUNTERS (N=76) % | EPISODIC ENCOUNTERS (N=148) % | PRINCIPAL CARE ENCOUNTERS (N=5286) % | CONSULTATIONS (N=284) % | SPECIALIZED CARE (N=566) % | TOTAL (N=6360) % |
| Hemodialysis | | | | | | |
| Hospital-Based Center | 25.0 | 29.7 | 42.4 | 25.7 | 24.7 | 39.5 |
| Freestanding Facility | 64.5 | 52.0 | 47.0 | 60.2 | 73.7 | 50.4 |
| Home | 0.0 | 0.0 | 2.1 | 2.1 | 0.2 | 1.8 |
| Peritoneal Dialysis | | | | | | |
| CAPD | 9.2 | 4.1 | 5.1 | 5.6 | 1.2 | 4.9 |
| IPD | 0.0 | 14.2 | 2.6 | 5.6 | 0.0 | 2.7 |
| CCPD | 1.3 | 0.0 | 0.8 | 0.7 | 0.2 | 0.7 |
| TOTAL | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

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[1] This table corresponds to Table 76 which shows the distribution of primary care classification by dialysis type.

where the combination of specialized/consultative care sums to 18.3%--compared to 13.4% overall. Also notable in the table are the somewhat higher rates of (non-consultation) "first encounters" for patients on CAPD and CCPD, and the high rate of episodic encounters for patients on IPD--an indication that these latter patients are more likely to be seen on a routine basis (e.g., on dialysis rounds) by someone other than their regular physician.

In Table 78 a number of "case-mix indices" derived from the characteristics presented in Tables 66 through 77 are presented. The renal disease etiology ratio is derived from the renal disease etiology shown in Tables 66 and 67, and consists of the number of patients with serious systemic disease (diabetic nephropathy, amyloidosis, multiple myeloma) divided by the number of patients with etiologies of glomerulonephritis or polycystic kidney disease. Thus a ratio of 0.6 in the table means that there is an average of 0.6 patients with serious systemic disease for each patient with relatively uncomplicated organ-specific disease--and the higher the number, the sicker the patient population.* The mean number of problems is based on the diagnoses shown in Tables 68 and 69; it is simply a count of how many diagnoses were recorded. (A maximum of three written diagnoses were coded from the survey.)

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*The etiology "primary hypertensive disease" was not included in the systemic disease component of the ratio, as the hypertension may have been under control as of the time the patient encounter occurred.

TABLE 78. CASE-MIX INDICES BY DIALYSIS TYPE (ESRD PATIENTS)[1]

| | CASE-MIX INDICES | | | | | |
|---|---|---|---|---|---|---|
| Type of Dialysis | RENAL DISEASE ETIOLOGY RATIO | MEAN NUMBER OF PROBLEMS (DIAGNOSES) | MEAN PATIENT AGE | PERCENTAGE NON-ANGLO PATIENTS | PERCENTAGE NON-AMBULATORY CARE | PERCENTAGE SPECIALIZED/ CONSULTATIVE CARE |
| (RAW DIFFERENCES) | $\bar{X}$ | $\bar{X}$ | $\bar{X}$ | % | % | % |
| Total | 0.6 | 1.81 | 53.4 | 44.0 | 28.3 | 13.4 |
| Hemodialysis | | | | | | |
| Hospital-Based Center | 0.6 | 1.86 | 54.5 | 37.2 | 32.6 | 8.5 |
| Freestanding Facility | 0.6 | 1.74 | 53.0 | 52.2 | 17.4 | 18.4 |
| Home | 0.2 | 1.89 | 48.9 | 20.3 | 59.3 | 6.0 |
| Peritoneal Dialysis | | | | | | |
| CAPD | 1.0 | 2.01 | 48.7 | 24.3 | 62.3 | 7.5 |
| IPD | 2.4 | 2.05 | 57.5 | 49.4 | 74.0 | 9.2 |
| CCPD[2] | 1.3 | 1.81 | 48.9 | 22.9 | 68.8 | 6.5 |
| *Statistical Significance* | *.000* | *.000* | *.000* | *.000* | *.000* | *.000* |

TABLE 78. (Continued)

| Type of Dialysis | CASE-MIX INDICES<br>RENAL DISEASE ETIOLOGY RATIO | MEAN NUMBER OF PROBLEMS (DIAGNOSES) | MEAN PATIENT AGE | PERCENTAGE NON-ANGLO PATIENTS | PERCENTAGE NON-AMBULATORY CARE | PERCENTAGE SPECIALIZED/ CONSULTATIVE CARE |
|---|---|---|---|---|---|---|
| (DIFFERENCES ADJUSTED FOR EACH OF THE OTHER INDICES) | $\overline{X}$ | $\overline{X}$ | $\overline{X}$ | % | % | % |
| Total | 0.6 | 1.89 | 51.2 | 39.3 | 27.8 | 13.2 |
| Hemodialysis | | | | | | |
| Hospital-Based Center | 0.6 | 1.91 | 52.0 | 33.9 | 30.0 | 9.5 |
| Freestanding Facility | 0.6 | 1.86 | 51.2 | 47.9 | 15.4 | 18.7 |
| Home | 0.3 | 1.85 | 46.8 | 22.9 | 56.7 | 3.8 |
| Peritoneal Dialysis | | | | | | |
| CAPD | 1.0 | 1.91 | 46.8 | 15.4 | 67.3 | 2.6 |
| IPD | 1.2 | 2.12 | 55.3 | 57.5 | 79.5 | 10.4 |
| CCPD[2] | 1.9 | 1.68 | 45.9 | 5.0 | 72.0 | 1.4 |
| *Statistical Significance* | *.000* | *.011* | *.000* | *.000* | *.000* | *.000* |

[1] The renal disease etiology ratio is the ratio of the number of patients with serious systemic disease (diabetic nephropathy, amyloidosis, multiple myeloma) to the number with organ-specific, relatively uncomplicated causes of ESRD (glomerulonephritis, polycystic kidney disease); with the organ-specific cases set at "1," the number shown is the corresponding ratio of systemic disease. Thus for all ESRD patients, there were 1,868 with either glomerulonephritis or polycystic kidney disease and 1,201 with diabetic nephropathy, amyloidosis, or multiple myeloma (see Table 41 or Tabel 67). The resulting ratio of 1:0.6 is shown as 0.6 in the "Total" column for the renal disease etiology ratio.

[2] Means and mean percentages for this category may be unrealiable due to the small number of encounters.

The percentage "non-anglo" patients is the sum of encounters with blacks, Hispanics, Asian or Pacific Islanders, and American Indians or Alaskan Natives (Tables 72 and 74). Percentage "non-ambulatory care" includes encounters in an inpatient dialysis unit as well as hospital wards or floors (Tables 74 and 75). Finally, the "percentage specialized/consultative care," combines these categories from Tables 76 and 77.

Each of the case-mix indices was tested across dialysis types using multiple classification analysis. The "raw" differences (each index tested without controlling for any of the others) are shown on the first page of Table 78. The table shows substantial differences in most of these ratios, all of which were statistically significant. For the renal disease etiology ratio, the scores for hospital center and freestanding facility dialysis are identical, and the ratio indicates that the sickest population is that undergoing IPD, whereas the least sick population is that on home hemodialysis. For the mean number of problems, CAPD and IPD patients have the most diagnoses recorded, although the differences shown in the table are not large. The mean patient ages were reported (above) in the text in conjunction with the discussion of Tables 70 and 71, and the remaining indices simply reflect the percentage differences previously noted in Tables 72 through 77.

Whereas the first page of Table 78 shows raw (or unadjusted) differences in case-mix indices by dialysis type, on the second page the MCA analysis shows differences in each index after statistically adjusting for the effects of all of the other indices. The reason for adjusting the indices for other sources of case-mix variation across dialysis types is to eliminate the potential impact of other exogenous variables on the case-mix differences shown on the first page of Table 78. As discussed above, perhaps the most crucial control in this process is the location of the encounter. Many of the self-care dialysis patients in the study are seen in the hospital (Table 74), and they will therefore necessarily represent the sickest portion of the total self-care patient population, with concomitant effects on other case-mix indices. The introduction of a statistical control for the percentage of non-ambulatory care will serve to adjust other indices for the impact of hospitalizations, and will thus produce differences across dialysis types "as if" rates of hospitalization did not differ as a function of the type of dialysis. Similarly, the introduction of a statistical control for the renal disease etiology ratio allows one to examine differences, say, in percentage non-ambulatory care by dialysis type with the effects of renal disease etiology held constant.

On the second page of Table 78 each case-mix index is examined while controlling simultaneously for the effects of all of the other indices. As shown in the table, this procedure alters the overall ("total") mean as well as differences among dialysis types. For example, the renal disease etiology ratio remains the same for both center and facility hemodialysis (at 0.6) but that for IPD is halved (from 2.4 to 1.2) following the introduction of statistical controls.

Number of problems, which was highly significant prior to the introduction of the statistical controls, becomes marginally significant following their introduction. The remaining indices are all significant and reinforce the pattern shown initially in the descriptive Tables (66-77) and subsequently supported by both the unadjusted and adjusted indices in Table 78:

- The ages of self-care patients (home demodialysis, CAPD and CCPD) are all about the same, and these patients are 3-4 years younger than the overall mean age. Hospital center hemodialysis patients are 1-1/2 years older than facility hemodialysis patients, although this difference becomes smaller with the introduction of statistical controls.
- Patients on IPD can be considered the sickest patient population; they are the oldest, they have the most problems recorded, they have the highest renal disease etiology ratio* (2-4 times that for center/facility hemodialysis), they have the highest percentage of hospitalization and the second highest percentage of specialized/consultative care, and (following the introduction of statistical controls in Table 78) they have the highest percentage of non-anglo patients. Conversely, the renal disease etiology ratio suggests that those on home hemodialysis are the least sick.

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*This excludes the 1.9 renal disease etiology ratio for CCPD (shown on the second page of Table 78, which is based on just 48 encounters.

- Hospital-based center hemodialysis has a higher hospitalization rate than does freestanding facility hemodialysis, along with a somewhat older patient population (as noted above). Freestanding facility hemodialysis, in contrast, has substantially more non-anglo patients and a much higher percentage of specialized/consultative care. However, there are few discernible differences in the respective morbidity profiles except for the somewhat higher rates of hypertension for freestanding facilities (as noted above).

The MCA analysis has thus shown that the differences in case-mix (by dialysis type) in Tables 66-77 are statistically significant and (through the introduction of controls) has shown that the findings are not spurious (i.e., that the observed effects remain when potentially confounding variables are held constant).

In Table 79, three of the six case-mix variables--patient age, renal disease etiology, and diagnosis--are used to construct "patient survival risk factors" for comparison across dialysis type. These risk factors are based on findings from a major regional study of risk factors in the survival of dialysis patients.[19] The study found that patients 61 years and older and those with medical complications had lower survival rates. The medical complications that were significantly related to survival are diabetes mellitus and (for non-diabetics) a malignancy (other than skin), arteriosclerotic heart disease, cerebral vascular disease, and chronic obstructive pulmonary

TABLE 79. PATIENT SURVIVAL RISK FACTORS BY DIALYSIS TYPE (ESRD PATIENTS)[1]

|  | PERCENTAGE PATIENTS WITH |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|
| Type of Dialysis | AGE 61 YEARS OR OLDER % | DIABETES MELLITUS % | NEOPLASMS % | ARTERIO-SCLEROTIC HEART DISEASE % | CEREBRAL VASCULAR ACCIDENT % | CHRONIC OBSTRUCTIVE PULMONARY DISEASE % | TOTAL: ANY NON-DIABETES RISK FACTOR % |
| (RAW DIFFERENCES) |  |  |  |  |  |  |  |
| Total | 36.8 | 18.9 | 2.4 | 3.5 | 0.7 | 2.1 | 8.4 |
| Hemodialysis |  |  |  |  |  |  |  |
| Hospital-Based Center | 40.4 | 18.1 | 2.6 | 3.8 | 0.7 | 2.3 | 9.2 |
| Freestanding Facility | 35.4 | 17.9 | 2.3 | 3.0 | 0.7 | 1.7 | 7.4 |
| Home | 19.7 | 9.3 | 0.0 | 5.1 | 1.7 | 4.2 | 11.0 |
| Peritoneal Dialysis |  |  |  |  |  |  |  |
| CAPD | 23.0 | 30.1 | 3.5 | 4.5 | 0.6 | 2.9 | 11.2 |
| IPD | 50.3 | 30.5 | 1.2 | 5.2 | 0.6 | 0.6 | 7.5 |
| CCPD[2] | 18.8 | 39.6 | 0.0 | 0.0 | 2.1 | 6.3 | 8.3 |
| *Statistical Significance* | *.000* | *.000* | *.180* | *.146* | *.674* | *.031* | *.066* |

TABLE 79. (Continued)

| | PERCENTAGE PATIENTS WITH[1] | | | | | | |
|---|---|---|---|---|---|---|---|
| Type of Dialysis | AGE 61 YEARS OR OLDER % | DIABETES MELLITUS % | NEOPLASMS % | ARTERIO-SCLEROTIC HEART DISEASE % | CEREBRAL VASCULAR ACCIDENT % | CHRONIC OBSTRUCTIVE PULMONARY DISEASE % | TOTAL: ANY NON-DIABETES RISK FACTOR % |
| (DIFFERENCES ADJUSTED FOR OTHER CASE-MIX INDICES)[3] | | | | | | | |
| Total | 36.7 | 18.9 | 2.4 | 3.5 | 0.7 | 2.1 | 8.4 |
| Hemodialysis | | | | | | | |
| Hospital-Based Center | 39.2 | 18.3 | 2.4 | 3.5 | 0.7 | 2.1 | 8.5 |
| Freestanding Facility | 37.0 | 17.9 | 2.7 | 3.4 | 0.8 | 1.9 | 8.5 |
| Home | 15.1 | 9.7 | 0.0 | 4.0 | 1.5 | 3.8 | 8.4 |
| Peritoneal Dialysis | | | | | | | |
| CAPD | 18.9 | 30.0 | 2.5 | 3.6 | 0.4 | 2.5 | 8.8 |
| IPD | 48.7 | 29.2 | 0.2 | 5.0 | 0.2 | 0.7 | 6.3 |
| CCPD[2] | 12.6 | 41.3 | 1.2 | 1.1 | 1.9 | 6.1 | 5.8 |
| *Statistical Significance* | *.000* | *.000* | *.033* | *.518* | *.698* | *.166* | *.906* |

[1] Diabetes mellitus percentages include patients with a renal disease etiology (Table 41) of diabetic nephropathy or a written diagnosis (Tables 50-52) of diabetes mellitus. Neoplasms percentages include patients with a renal disease etiology of multiple myeloma or a written diagnosis of any neoplasm except skin cancer. Arteriosclerotic heart disease includes written diagnoses falling under the heading "Other forms of chronic ischemic heart disease" (code 414) in the International Classification of Diseases, Ninth Edition - Clinical Modification (ICD-9). Cerebral vascular accident includes subarachnoid hemorrhage, intracerebral hemorrhage, other and unspecified intracranial hemorrhage, and acute but ill-defined cerebrovascular disease (ICD-9 codes 430, 431, 432 and 436). Chronic obstructive pulmonary disease includes that written diagnosis plus the more specific diagnoses of bronchitis, emphysema, asthma, bronchiectasis, and extrinsic allergic alveolitis (ICD-9 codes 490-496). The basis for the use of these patient survival risk factors is explained in the text.

TABLE 79. (Continued)

[2] Mean percentages for this category may be unreliable due to the small number of encounters.

[3] The patient survival risk factors incorporate, either wholly or partially, three of the six case-mix indices presented in Table 78: Renal disease etiology (ratio), number of problems (diagnoses), and patient age. The lower half of the above table shows differences in patient survival controlling for the three remaining case-mix indices: percentage non-anglo patients, percentage non-ambulatory encounters, and percentage specialized/consultative care.

disease.* In the table the raw (unadjusted) percentages show that only "age 61 or older" and diabetes mellitus differ significantly by dialysis type. The table shows how few self-care patients are 61 or over, whereas half of the IPD patients are in this age category. The diabetes mellitus percentages, based on either a renal disease etiology of diabetic nephropathy or a written diagnosis of diabetes, illustrate again the higher levels of diabetes for peritoneal dialysis patients, the substantially lower level for home hemodialysis patients, and the absence of any substantive difference between hospital-center and facility hemodialysis.

On the second page of Table 79, these patient survival risk factors are adjusted for the three remaining case-mix variables that were not used to derive the risk factors: race/ethnicity, encounter location and primary care classification. As in Table 78, the control for encounter location assumes particular importance, since it will serve to counter the possible bias of hospital encounters with (the sickest portion of) self-care dialysis patients. As shown in the table, the introduction of these controls has little impact upon the relationships shown on the basis of unadjusted differences. Age 61 or older and diabetes mellitus remain statistically significant, whereas the other risk factors become less significant (with the exception of neoplasms, which approaches statistical significance following the introduction of the controls).

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*The latter medical complications were not significant for patients with diabetes; therefore, Table 79 presents a "total" that sums only non-diabetic risk factors. Footnote 1 in Table 79 explains how the risk factors were derived from a combination of the renal disease etiology plus written diagnoses recorded for each patient. This study used "neoplasm" rather than "malignancy" as a risk factor since few of the written diagnoses characterized malignancies as benign or malignant. Patient sex, which has been shown to be a risk factor in other studies,[20] was not found to be statistically significant in the study that forms the basis for the categories used in Table 79.[19] The percentage male patients by dialysis type is as follows--hospital-based center, 53.8%; freestanding facility, 52.6%; home hemodialysis, 65.8%; CAPD, 45.0%; IPD, 35.6%; CCPD, 37.5%.

Finally, Table 80 examines differences in the provision of "non-routine" care by dialysis type. One aspect of non-routine care--the hospitalization of an ESRD patient--has of course been a pivotal element of the entire case-mix analysis; Table 80 examines other potential indices of non-routine care for an ESRD patient: urgent care (where the encounter is an emergency or the patient should have been seen sooner ), future hospital contact (e.g., the physician plans to admit the patient or see the patient on hospital rounds), and the referral of a patient to another physician for either care or consultation. In order to eliminate the specialized/consultative component of renal physicians' practices from the comparison by dialysis type, the data in Table 80 are restricted to principal care encounter--those in which the patient is being treated by his or her regular physician. (Another crucial control--that for encounter location--is incorporated in the non-survival-related adjustment in Table 80.)

As shown in the "raw differences" at the top of the table, urgent care, future hospital contact, and surgical referrals (along with the total of medical and surgical referrals) differ significantly by dialysis type. Urgent care is higher for CAPD and IPD patients,

TABLE 80. INDICES OF NON-ROUTINE PRINCIPAL CARE BY DIALYSIS TYPE (ESRD PATIENTS)[1]

|  | INDICES OF NON-ROUTINE CARE |  |  |  |  |
|---|---|---|---|---|---|
|  |  |  | PERCENTAGE REFERRALS/CONSULTATIONS |  |  |
| Type of Dialysis | PERCENTAGE URGENT CARE<br>% | PERCENTAGE FUTURE HOSPITAL CONTACT<br>% | TO MEDICAL SPECIALISTS<br>% | TO SURGEONS<br>% | TOTAL: TO MEDICINE OR SURGERY<br>% |
| (RAW DIFFERENCES) |  |  |  |  |  |
| Total | 3.2 | 21.7 | 2.6 | 4.7 | 7.3 |
| Hemodialysis |  |  |  |  |  |
| Hospital-Based Center | 3.6 | 22.5 | 2.6 | 4.1 | 6.7 |
| Freestanding Facility | 2.4 | 13.7 | 2.3 | 4.7 | 7.0 |
| Home | 3.7 | 48.6 | 3.7 | 12.0 | 15.7 |
| Peritoneal Dialysis |  |  |  |  |  |
| CAPD | 5.9 | 57.0 | 5.6 | 5.6 | 11.2 |
| IPD | 5.9 | 44.1 | 1.5 | 7.4 | 8.9 |
| CCPD[2] | 2.4 | 71.4 | 4.9 | 7.3 | 12.2 |
| *Statistical Significance* | *.006* | *.000* | *.029* | *.003* | *.001* |
| (DIFFERENCES ADJUSTED FOR NON-SURVIVAL-RELATED INDICES)[3] |  |  |  |  |  |
| Total | 3.2 | 21.7 | 2.6 | 4.7 | 7.3 |
| Hemodialysis |  |  |  |  |  |
| Hospital-Based Center | 3.5 | 21.6 | 2.5 | 4.0 | 6.5 |
| Freestanding Facility | 2.9 | 19.9 | 2.6 | 5.3 | 7.9 |
| Home | 2.1 | 29.0 | 2.7 | 9.8 | 12.5 |
| Peritoneal Dialysis |  |  |  |  |  |
| CAPD | 4.2 | 35.4 | 4.5 | 3.1 | 7.6 |
| IPD | 3.8 | 15.0 | 0.6 | 3.8 | 4.4 |
| CCPD[2] | 0.2 | 44.3 | 3.5 | 4.2 | 7.7 |

TABLE 80. (Continued)

| | INDICES OF NON-ROUTINE CARE | | | | |
|---|---|---|---|---|---|
| | | | PERCENTAGE REFERRALS/CONSULTATIONS | | |
| Type of Dialysis | PERCENTAGE URGENT CARE | PERCENTAGE FUTURE HOSPITAL CONTACT | TO MEDICAL SPECIALISTS | TO SURGEONS | TOTAL: TO MEDICINE OR SURGERY |
| | % | % | % | % | % |
| (DIFFERENCES ADJUSTED FOR SURVIVAL-RELATED INDICES)[4] | | | | | |
| Total | 3.1 | 22.7 | 2.7 | 4.9 | 7.6 |
| Hemodialysis | | | | | |
| Hospital-Based Center | 2.4 | 21.1 | 2.4 | 4.8 | 7.2 |
| Freestanding Facility | 3.0 | 13.0 | 2.5 | 4.6 | 7.1 |
| Home | 3.4 | 47.6 | 3.4 | 6.8 | 10.2 |
| Peritoneal Dialysis | | | | | |
| CAPD | 5.6 | 65.9 | 5.1 | 5.7 | 10.8 |
| IPD | 11.0 | 45.1 | -0.7 | 5.8 | 5.1 |
| CCPD[2] | -0.2 | 78.6 | 7.4 | 10.9 | 18.3 |
| *Statistical Significance* | *.003* | *.000* | *.089* | *.666* | *.115* |

[1] Table is restricted to principal care encounters, which account for 83.1% of all care provided to ESRD patients (Table 76). Case-base (n) for the table is 5286. Urgent care is care that the physician codes as an emergency or notes that the patient should have (been) seen sooner (Table 47). Percentage future hospital contact refers to encounters in which the physician expects to see the patient at hospital admission, on rounds (prior admission), or in the ICU, ER, or extended care facility (Table 48). Percentages of referrals to medical and surgical specialists combine those that are referrals for care and those that are consultations.

[2] Mean percentages for this category may be unreliable due to the small number of encounters.

TABLE 80. (Continued)

[3] Non-survival-related indices are those case-mix indices that are not used explicitly as patient survival risk factors in Table 79. These are percentage non-anglo patients and percentage non-ambulatory care. Those encounters involving specialized or consultative care are excluded by restricting the analysis to principal care encounters.

[4] Survival related indices are those that incorporate, either partially or wholly, the patient survival risk factors shown in Table 79: renal disease etiology (ratio), number of problems (diagnoses), and patient age.

future hospital contact highest for self-care patients (home hemodialysis, CAPD and CCPD), and surgical referrals substantially higher for home hemodialysis patients. Following the introduction of non-survival-related controls for race/ethnicity and encounter location, only future hospital contact remains significant; it is notable that future hospital contact is higher for all types of self-care patients despite the introduction of a control for whether the patient is hospitalized at the time of the encounter.

The last set of data in Table 80 utilizes indices related to the survival factors presented in Table 79 as statistical controls in examining non-routine care. These are the renal disease etiology ratio (from Table 78) the number of diagnoses (without regard to the nature of the diagnosis), and patient age. Of the two indices found to be statistically significant, future hospital contact has essentially the same pattern as found prior to the introduction of controls (top of Table 80), whereas urgent care shows a substantially higher percentage for IPD with the survival-related controls. This letter finding indicates that IPD patients are more likely to require urgent medical care for reasons not accounted for by the presence of pre-existing comorbid conditions.

## Patient Risk Factors and Patterns of Care

The multivariate analysis of patterns of care presented in the previous chapter (Tables 61-65) sought to account for variation in four key aspects of the actions taken by a physician during an encounter with an ESRD patient: time spent with the patient, use of diagnostic tests, use of therapeutic procedures, and complexity of the services provided. As shown in Table 61 (above), the analysis regressed each of these variables against two categories of independent variables--(i) patient and encounter characteristics such as patient age, dialysis type, and encounter location, and (ii) physician/practice characteristics such as board certification status, metropolitan/non-metropolitan practice location, and weekly workload. In doing so, the analysis attempted to explain the maximum amount of variation in each of the dependent variables by means of "structural" characteristics of the patient, the physician, or the encounter between the two; because of limitations on the use of clinical (diagnostic) information in quantitative analyses, no attempt was made to explain actions taken by the physician in terms of the medical condition of the patient (i.e., presence of medical complications).

In the analysis reported here, the attempt to explain variation in physician care for ESRD patients has been refined to incorporate diagnostic information. Not all diagnostic categories are differentiated; instead, those diagnostic categories identified as patient survival risk factors (Table 79) are employed, along with the additional risk factor of patient age. By regressing time per encounter, diagnostic tests, therapeutic procedures, and complexity of service against patient survival risk factors, the analysis will show the impact of medical complications upon patterns of care. By subsequently entering patient survival risk factors into regression equations prior to the (stepwise) entry of other case-mix variables and physician/practice characteristics, the regression will be able to show the impact of these latter types of variables, controlling in part for the effects of medical complications.

The introduction of partial diagnostic information (in the form of patient survival risk factors) is one of the three refinements to the regression analysis shown in Tables 61 through 65; the second is the use of weighted sums of diagnostic tests and therapeutic procedures. As discussed in conjunction with the initial regressions, nominal-level data such as categories of tests and procedures do not readily lend themselves to entry into multivariate analyses, which generally require the use of interval-level data. As an heuristic technique, the regressions reported in Tables 63 and 64 employed simple counts of the number of different tests and procedures utilized during a patient encounter. While this produced an interval-level measure, a good deal of information is "lost" this way, as the most routine tests and procedures are treated the same as those that are the most complex and time consuming.

In order to derive a more rigorous interval-level measure of the use of tests and procedures, the researchers had the complexity of each of the tests and procedures shown in Tables 43 and 44 rated (on a 1-5 scale) by a panel of internists and other specialists. The panelists were asked to rate each category based on the complexity of the use of the test or procedure from the physician's point of view. As noted in the discussion of this rating system (in the Appendix) panelists were not told that the ratings applied to a patient with ESRD.

Rather, the panel's mission was to assign scores to a large number of tests and procedures used by internists (including those incorporated into the ESRD survey) without regard to the patient's diagnosis. The specific rating criteria, along with the resulting scores for diagnostic tests and therapeutic procedures, are shown in Tables 100 and 101 in the Appendix. A comparison between simple counts of tests and procedures and these weighted sums is shown in Table 102. The weighted sums, computed by adding the scores of each category of test/procedure employed during a patient encounter, constitute a type of data that more accurately reflect differences in care provided during an encounter with an ESRD patient.

As shown in Table 81, the third refinement over the regressions shown previously is the disaggregation of the data by encounter location. Using the weighted sums of tests/procedures discussed above, it was found that encounter location accounts for 21% of the variance in time per encounter, 12% of the variance in use of diagnostic tests, 6% of the variance in the use of therapeutic procedures, and 23% of the variance in the use of therapeutic procedures. Whereas the entry of encounter location into a regression equation will therefore substantially increase the amount of variance explained by that equation, its substantial impact upon the dependent variables may have the effect of masking or confounding the impact of other factors. Since separate regressions will be employed for encounters in the office/OPD/clinic, outpatient dialysis unit, inpatient dialysis unit, and hospital, Table 81 (which shows the means for each variable)

TABLE 81. REGRESSION OF PATIENT ENCOUNTER CHARACTERISTICS AGAI
SURVIVAL RISK FACTORS, OTHER CASE-MIX VARIABLES, AND
PRACTICE CHARACTERISTICS: VARIABLES ENTERED INTO TH
BY ENCOUNTER LOCATION (ESRD PATIENTS)[1]

| | ENCOUNTER LOCATION | | | |
|---|---|---|---|---|
| Variable | OFFICE, OPD/CLINIC (N=291) $\bar{X}$ | OUTPATIENT DIALYSIS UNIT (N=4264) $\bar{X}$ | INPATIENT DIALYSIS UNIT (N=569) $\bar{X}$ | HOSPIT INPATI (N=124 $\bar{X}$ |
| DEPENDENT VARIABLES | | | | |
| Time Per Encounter | 19.77 | 6.36 | 10.89 | 17.01 |
| Weighted sum of diagnostic tests[2] | 1.99 | 0.69 | 1.48 | 2.43 |
| Weighted sum of therapeutic procedures[2] | 3.32 | 1.74 | 2.80 | 3.22 |
| Complexity of service | 2.98 | 1.98 | 2.53 | 3.25 |
| PATIENT SURVIVAL RISK FACTORS | | | | |
| Patient Age | 50.82 | 53.24 | 52.96 | 54.53 |
| Diabetes mellitus | 0.20 | 0.18 | 0.17 | 0.24 |
| Neoplasms | 0.01 | 0.02 | 0.03 | 0.04 |
| Arteriosclerotic Heart Disease | 0.03 | 0.03 | 0.04 | 0.03 |
| Cerebral Vascular Accident | <0.01 | <0.01 | 0.01 | 0.01 |
| Chronic Obstructive Pulmonary Disease | 0.02 | 0.02 | 0.01 | 0.02 |
| CASE-MIX VARIABLES | | | | |
| Race Ethnicity (Ref: White, Non-Hispanic) | | | | |
| Black Patient* | 0.27 | 0.35 | 0.35 | 0.2 |
| Hispanic Patient* | 0.08 | 0.09 | 0.05 | 0.0 |
| Asian/American Indian* | 0.02 | 0.03 | 0.02 | 0.0 |
| Dialysis-Modality (Ref: Hospital Center Hemodialysis) | | | | |
| Freestanding Facility Hemodialysis* | 0.48 | 0.59 | 0.31 | 0.3 |
| Home Hemodialysis* | 0.13 | <0.01 | 0.03 | 0.0 |
| CAPD* | 0.23 | 0.01 | 0.03 | 0.1 |
| IPD/CCPD* | 0.04 | 0.01 | 0.05 | 0.1 |

TABLE 81. (CONTINUED)

| | ENCOUNTER LOCATION | | | | |
|---|---|---|---|---|---|
| Variable | OFFICE, OPD/CLINIC (N=291) $\bar{X}$ | OUTPATIENT DIALYSIS UNIT (N=4264) $\bar{X}$ | INPATIENT DIALYSIS UNIT (N=569) $\bar{X}$ | HOSPITAL INPATIENT (N=1240) $\bar{X}$ | *Statistical Significance* |
| PHYSICIAN/PRACTICE CHARACTERISTICS | | | | | |
| Practice Arrangement (Ref: Solo) | | | | | |
| Group Practice* | 0.59 | 0.57 | 0.70 | 0.59 | *.000* |
| Institutional Practice* | 0.30 | 0.41 | 0.33 | 0.28 | *.000* |
| Physician Age | 40.71 | 41.26 | 42.48 | 40.53 | *.000* |
| Board Certification (Ref: Nephrology Board) | | | | | |
| Internal Medicine Board* | 0.30 | 0.24 | 0.30 | 0.23 | *.001* |
| No Board Certification* | 0.11 | 0.13 | 0.14 | 0.16 | *.040* |
| Metropolitan/Non-Metropolitan Practice (Ref: Metropolitan) | | | | | |
| Non-Metropolitan Practice* | 0.07 | 0.02 | 0.01 | 0.06 | *.000* |
| Number of Dialysis Facilities | 2.23 | 2.21 | 2.13 | 2.11 | *.014* |
| Reimbursement for Dialysis (Ref: Alternate Method) | | | | | |
| Fee for Service Reimbursement* | 0.06 | 0.11 | 0.17 | 0.13 | *.000* |
| Owner of Dialysis Facility (Ref: Non-Owner) | | | | | |
| Facility Owner* | 0.14 | 0.15 | 0.11 | 0.18 | *.003* |
| Number of Dialysis Stations | 18.26 | 20.22 | 21.95 | 19.68 | *.000* |
| Number of Dialysis Patients | 81.46 | 68.92 | 90.16 | 70.31 | *.000* |
| Weekly Workload | 113.63 | 156.13 | 135.44 | 133.45 | *.000* |

TABLE 81. (CONTINUED)

[1] Asterisks (*) indicate nominal-level (categorical) characteristics represented in the regression equations by dummy variables. Reference categories for each set of dummy variables are shown in parentheses.

[2] Weighted sums of diagnostic tests and therapeutic procedures differ from the mean numbers of tests and procedures employed in the regressions shown in Tables 61, 63, and 64. See text and the Appendix for explanation of the derivation of these weighted sums.

uses the analysis of variance to test the statistical significance of each of the regression variables across encounter locations. As shown in the table, all of the dependent variables differ significantly by encounter location, along with patient age, diabetes mellitus, and neoplasms (of the patient survival risk factors) and almost all of the case-mix variables and physician/practice characteristics.

Table 82 shows the regression of time per encounter against patient survival risk factors. In this regression, all of the risk factors are entered simultaneously (whether they are significant or not), and those that are statistically significant ($P \leq .01$) are marked with an asterisk. The only significant impact is that of arteriosclerotic heart disease in the inpatient dialysis unit, where the presence of this condition adds 6.47 minutes per encounter to the "constant" of 10.51 minutes.

In Table 83, the patient survival risk factors are again entered into the regression equation simultaneously, followed by the stepwise entry of other characteristics based on their contribution to the variance explained in time per encounter. The stepwise variables will generally be statistically significant; only occasionally will the entry of additional variables on subsequent steps of the regression cause a stepwise variable to "lose" significance. As shown in the table, different sets of variables exert an impact on encounter time in each of the locations, thus supporting the use of separate regressions. However, either or both of two measures of patient volume--number of dialysis patients and weekly workload--have a negative impact

TABLE 82. REGRESSION OF TIME PER ENCOUNTER AGAINST PATIENT SURVIVAL RISK FACTORS, BY ENCOUNTER LOCATION (ESRD PATIENTS)[1]

| Variable | ENCOUNTER LOCATION<br>OFFICE OPD/CLINIC (B) | OUTPATIENT DIALYSIS UNIT (B) | INPATIENT DIALYSIS UNIT (B) | HOSPITA INPATIE (B) |
|---|---|---|---|---|
| (UNSTANDARDIZED REGRESSION COEFFICIENT) | | | | |
| Patient Age | -0.07 | < -0.01 | < -0.01 | <0.0 |
| Diabetes Mellitus | 1.83 | 0.49 | 2.45 | 1.5 |
| Neoplasms | 1.51 | 0.86 | -1.43 | 0.5 |
| Arteriosclerotic Heart Disease | 0.10 | -0.34 | 6.47* | -1.8 |
| Cerebral Vascular Accident | -2.01 | -1.19 | -2.00 | -3.7 |
| Chronic Obstructive Pulmonary Disease | -6.48 | 0.11 | -5.09 | -2.0 |
| (Constant) | 23.36 | 6.39 | 10.51 | 15.5 |
| (STANDARDIZED REGRESSION COEFFICIENT) | (Beta) | (Beta) | (Beta) | (Bet |
| Patient Age | -0.09 | -0.01 | -0.01 | 0.0 |
| Diabetes Mellitus | 0.06 | 0.03 | 0.10 | 0.0 |
| Neoplasms | 0.01 | 0.02 | -0.03 | 0.0 |
| Arteriosclerotic Heart Disease | 0.00 | -0.01 | 0.13* | -0.0 |
| Cerebral Vascular Accident | -0.01 | -0.01 | -0.02 | -0.0 |
| Chronic Obstructive Pulmonary Disease | -0.08 | < 0.01 | -0.06 | -0.0 |

[1] Reference category for patient survival risk factors is a patient who ha none of the comorbid conditions listed above. Regression was simultaneo for all patient survival risk factors. Statistically significant predictors of encounter time are marked with an asterisk. The regression equation as a whole failed to achieve statistical significance for any of th four encounter locations, but is nearly significant for "inpatient dialysis unit."

TABLE 83. REGRESSION OF TIME PER ENCOUNTER AGAINST PATIENT SURVIVAL RISK FACTORS AND OTHER CHARACTERISTICS, BY ENCOUNTER LOCATION (ESRD PATIENTS)[1]

| | ENCOUNTER LOCATION | | | |
|---|---|---|---|---|
| Variable | OFFICE OPD/CLINIC (B) | OUTPATIENT DIALYSIS UNIT (B) | INPATIENT DIALYSIS UNIT (B) | HOSPITAL INPATIENT (B) |
| (UNSTANDARDIZED REGRESSION COEFFICIENT) | | | | |
| Patient Age | -0.07 | <-0.01 | 0.02 | 0.02 |
| Diabetes Mellitus | 1.35 | 0.52 | 1.44 | 0.82 |
| Neoplasms | -0.63 | 0.18 | -1.13 | 1.26 |
| Arteriosclerotic Heart Disease | -0.51 | -0.46 | 5.80* | -0.33 |
| Cerebral Vascular Accident | -4.17 | -0.44 | -2.23 | -1.94 |
| Chronic Obstructive Pulmonary Disease | -2.83 | -0.08 | -2.88 | -1.79 |
| Number of Dialysis Patients | -0.04* | -- | -- | -0.03* |
| Weekly Workload | -- | -0.02* | -- | -0.04* |
| Freestanding Facility Hemodialysis | -- | -1.87* | -- | -- |
| CAPD | -- | 8.90* | 11.83* | -- |
| Fee for service reimbursement | -- | 1.88* | -4.59* | -- |
| Number of Dialysis Stations | -- | -0.04* | -0.14* | -- |
| Black Patient | -- | -0.72* | -2.65* | -- |
| Physician Age | -- | 0.05* | -- | -- |
| Non-Metropolitan Practice | -- | 1.66* | -- | -- |
| Internal Medicine Board | -- | -- | -4.60* | -- |
| Institutional Practice | -- | -- | -6.28* | -4.10* |
| Group Practice | -- | -- | -2.54* | -- |
| No Board Certification | -- | -- | -- | 3.86* |
| (Constant) | 26.29 | 9.45 | 18.97 | 24.57 |

TABLE 83. (CONTINUED)

| | ENCOUNTER LOCATION | | | |
|---|---|---|---|---|
| Variable | OFFICE OPD/CLINIC (Beta) | OUTPATIENT DIALYSIS UNIT (Beta) | INPATIENT DIALYSIS UNIT (Beta) | HOSPITAL INPATIENT (Beta) |
| (STANDARDIZED REGRESSION COEFFICIENT) | | | | |
| Patient Age | -0.09 | <-0.01 | 0.04 | 0.02 |
| Diabetes Mellitus | 0.04 | 0.04 | 0.06 | 0.02 |
| Neoplasms | -0.01 | < 0.01 | -0.02 | 0.01 |
| Arteriosclerotic Heart Disease | -0.01 | -0.01 | 0.12* | <-0.01 |
| Cerebral Vascular Accident | -0.02 | -0.01 | -0.02 | -0.01 |
| Chronic Obstructive Pulmonary Disease | -0.04 | <-0.01 | -0.03 | -0.02 |
| Number of Dialysis Patients | -0.24* | -- | -- | -0.10* |
| Weekly Workload | -- | -0.26* | -- | -0.16* |
| Freestanding Facility Hemodialysis | -- | -0.17* | -- | -- |
| CAPD | -- | 0.17* | 0.21* | -- |
| Fee for service reimbursement | -- | 0.11* | -0.18* | -- |
| Number of dialysis stations | -- | -0.08* | -0.19* | -- |
| Black Patient | -- | -0.06* | -0.13* | -- |
| Physician Age | -- | 0.06* | -- | -- |
| Non-Metropolitan Practice | -- | 0.04* | -- | -- |
| Internal Medicine Board | -- | -- | -0.22* | -- |
| Institutional Practice | -- | -- | -0.31* | -0.11* |
| Group Practice | -- | -- | -0.12* | 0.09* |
| No Board Certification | -- | -- | -- | -- |

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[1] Reference categories for dummy variable regression are a white (non-Hispanic) patient on hospital center hemodialysis, with none of the comorbid conditions listed above, who is being treated by a board-certified nephrologist in solo practice, who is located in a metropolitan area, does not own a dialysis facility, and is reimbursed under the alternate (capitation) plan. Regression was simultaneous for all patient survival risk factors, stepwise for all other characteristics. Statistically significant predictors of encounter time are marked with an asterisk. (Stepwise variables sometimes lose statistical significance upon the entry of additional variables into the regression equation.) The regression equation as a whole failed to achieve statistical significance for "Office, OPD/Clinic." Of the three regressions that were significant, that for outpatient dialysis explained 19% of the variance in encounter time, that for inpatient dialysis 28%, and that for hospital inpatient 6%.

on encounter time in each location except for the inpatient dialysis unit, where it is notable that arteriosclerotic heart disease remains significant following the entry of all other statistically significant variables.

The standardized regression coefficients (beta), shown on the second page of Table 83, permit valid comparisons of the impact of variables that were initially measured in different units (although the standardized coefficients can no longer be interpreted in terms of minutes per encounter). These standardized coefficients show the substantial impact of measures of patient volume in locations other than inpatient dialysis. For inpatient dialysis, the strongest negative predictors of encounter time are that the physician is in institutional (as opposed to solo) practice and is board certified in internal medicine (but not in nephrology), whereas the strongest upward influence on encounter time is an encounter with a CAPD patient. (This later finding is probably due to patients undergoing dialysis training in inpatient dialysis units.) The regression for outpatient dialysis unit explained 19% of the variance in encounter time, that for inpatient dialysis unit 28%, and that for hospital inpatient 6%, while the regression as a whole for office, OPD/clinic was not significant.

In Table 84 the weighted sum of diagnostic tests is regressed against patient survival risk factors. In the outpatient dialysis unit, arteriosclerotic heart disease contributes significantly to the use of diagnostic tests, whereas diabetes mellitus and cerebral

TABLE 84. REGRESSION OF WEIGHTED DIAGNOSTIC TESTS AGAINST PATIENT SURVIVAL RISK FACTORS, BY ENCOUNTER LOCATION (ESRD PATIENTS)[1]

| | ENCOUNTER LOCATION | | | |
|---|---|---|---|---|
| Variable | OFFICE OPD/CLINIC (B) | OUTPATIENT DIALYSIS UNIT (B) | INPATIENT DIALYSIS UNIT (B) | HOSPITAL INPATIENT (B) |
| (UNSTANDARDIZED REGRESSION COEFFICIENT) | | | | |
| Patient Age | <0.01 | <0.01 | 0.05 | <-0.01 |
| Diabetes Mellitus | 0.60 | 0.03 | 0.65* | 0.03 |
| Neoplasms | 0.47 | 0.08 | 0.15 | -0.93 |
| Arteriosclerotic Heart Disease | 1.67 | 0.39* | 0.74 | -0.44 |
| Cerebral Vascular Accident | 3.28 | -0.02 | 6.33* | 0.76 |
| Chronic Obstructive Pulmonary Disease | -0.83 | 0.21 | 0.08 | <-0.01 |
| (Constant) | 1.66 | 0.62 | 1.04 | 2.60 |
| (STANDARDIZED REGRESSION COEFFICIENT) | (Beta) | (Beta) | (Beta) | (Beta) |
| Patient age | 0.02 | 0.01 | 0.03 | -0.01 |
| Diabetes Mellitus | 0.10 | 0.01 | 0.11* | < 0.01 |
| Neoplasms | 0.02 | 0.01 | 0.01 | -0.06 |
| Arteriosclerotic Heart Disease | 0.12 | 0.05* | 0.06 | -0.03 |
| Cerebral Vascular Accident | 0.08 | <-0.01 | 0.20* | 0.03 |
| Chronic Obstructive Pulmonary Disease | -0.05 | 0.02 | <0.01 | <-0.01 |

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[1] Reference category for patient survival risk factors is a patient who has none of the comorbid conditions listed above. Regression was simultaneous for all patient survival risk factors. Statistically significant predictors of weighted diagnostic tests are marked with an asterisk. The regression equation as a whole achieved statistical significance only for inpatient dialysis unit, where it explained 7% of the variance in the use of diagnostic tests. Weighted sums of diagnostic tests differ from the mean numbers of tests employed in the regression shown in Tables 61 and 63. See text and the Appendix for explanation of the derivation of these weighted sums.

vascular accident contribute to their use in the inpatient dialysis unit. As shown by the standardized regression coefficients in Table 84, the relative "contributions" of diabetes and CVA to the use of tests is not as great as one might surmise from the unstandardized coefficients; the contribution of CVA to the use of tests is not quite double that for diabetes (beta = .20 and .11, respectively). Only the CVA finding remains significant, however, following the entry of stepwise variables in Table 85. As with time per encounter (Table 83), weekly workload and/or number of dialysis patients exert a negative impact on the use of diagnostic tests, except in the inpatient dialysis unit. The standardized regression coefficients in Table 85 show a fairly strong negative impact of institutional practice on the use of tests in the inpatient dialysis unit, and once again show little correspondence among significant predictors for different encounter locations. The regression for inpatient dialysis explained 11% of the variance in the use of diagnostic tests, and 3% of the variance in the outpatient dialysis unit and hospital inpatient, whereas the overall equation for office, OPD/clinic failed to achieve statistical significance.

Table 86 shows the regression of the weighted sum of therapeutic procedures against patient survival risk factors. Arteriosclerotic heart disease contributes significantly to the use of procedures for both outpatient dialysis and hospital inpatient, whereas neoplasms are signficant for outpatient dialysis and diabetes for inpatient dialysis. Note, however, that the actual explanatory power of these

TABLE 85. REGRESSION OF WEIGHTED DIAGNOSTIC TESTS AGAINST PATIENT SURVIVAL RISK FACTORS AND OTHER CHARACTERISTICS, BY ENCOUNTER LOCATION (ESRD PATIENTS)[1]

| | ENCOUNTER LOCATION | | | |
|---|---|---|---|---|
| Variable | OFFICE OPD/CLINIC (B) | OUTPATIENT DIALYSIS UNIT (B) | INPATIENT DIALYSIS UNIT (B) | HOSPITAL INPATIENT (B) |
| (UNSTANDARDIZED REGRESSION CCEFFICIENT) | | | | |
| Patient Age | < 0.01 | <0.01 | <0.01 | <-0.01 |
| Diabetes Mellitus | 0.77 | 0.03 | 0.49 | -0.06 |
| Neoplasms | -0.02 | 0.04 | 0.30 | -0.95 |
| Arteriosclerotic Heart Disease | 1.65 | 0.33 | 0.73 | -0.08 |
| Cerebral Vascular Accident | 3.10 | -0.07 | 6.00* | 0.96 |
| Chronic Obstructive Pulmonary Disease | -0.80 | 0.21 | 0.36 | -0.03 |
| Weekly workload | -0.01* | <-0.01* | -- | -0.01* |
| Institutional practice | -- | -0.24* | -0.79* | -- |
| CAPD | -- | 0.68* | -- | -- |
| Group practice | -- | 0.19* | -- | -- |
| Freestanding facility hemodialysis | -- | -0.15* | -0.53 | -- |
| Number of Dialysis patients | -- | <-0.01* | <-0.01* | -- |
| Fee for service reimbursement | -- | -- | -0.83* | --<br>-- |
| Physician age | -- | -- | -- | -0.05* |
| Number of dialysis stations | -- | -- | -- | 0.03* |
| (Constant) | 2.58 | 1.13 | 2.08 | 4.67 |

TABLE 85. (CONTINUED)

| Variable | ENCOUNTER LOCATION<br>OFFICE OPD/CLINIC (Beta) | OUTPATIENT DIALYSIS UNIT (Beta) | INPATIENT DIALYSIS UNIT (Beta) | HOSPITAL INPATIENT (Beta) |
|---|---|---|---|---|
| (STANDARDIZED REGRESSION COEFFICIENT) | | | | |
| Patient Age | 0.02 | 0.01 | 0.02 | < -0.01 |
| Diabetes Mellitus | 0.12 | 0.01 | 0.08 | -0.01 |
| Neoplasms | <-0.01 | < 0.01 | 0.02 | -0.06 |
| Arteriosclerotic Heart Disease | 0.12 | 0.04 | 0.06 | <-0.01 |
| Cerebral Vascular Accident | 0.07 | < -0.01 | 0.19* | 0.03 |
| Chronic Obstructive Pulmonary Disease | -0.05 | 0.02 | 0.02 | <-0.01 |
| Weekly workload | -0.18* | -0.10* | -- | -0.10* |
| Institutional practice | -- | -0.09* | -0.16* | -- |
| CAPD | -- | 0.05* | -- | -- |
| Group practice | -- | 0.07* | -- | -- |
| Freestanding facility hemodialysis | -- | -0.05* | -0.10 | -- |
| Number of dialysis patients | -- | -0.05* | -- | -- |
| Fee for service reimbursement | -- | -- | -0.13* | -- |
| Number of dialysis patients | -- | -- | -0.13* | -- |
| Physician age | -- | -- | -- | -0.11* |
| Number of dialysis stations | -- | -- | -- | 0.09* |

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[1] Reference categories for dummy variable regression are a white (non-Hispanic) patient on hospital center hemodialysis, with none of the comorbid conditions listed above, who is being treated by a board-certified nephrologist in solo practice, who is located in a metropolitan area, does not own a dialysis facility, and is reimbursed under the alternate (capitation) plan. Regression was simultaneous for all patient survival risk factors, stepwise for all other characteristics. Statistically significant predictors of weighted diagnostic tests are marked with an asterisk. (Stepwise variables sometimes lose statistical significance upon the entry of additional variables into the regression equation.) The regression equation as a whole failed to achieve statistical significance for "Office, OPD/Clinic." Of the three regressions that were significant, that for outpatient dialysis explained 3% of the variance in the use of diagnostic tests, that for inpatient dialysis 11%, and that for hospital inpatient 3%. Weighted sums of diagnostic tests differ from the mean numbers of tests employed in the regression shown in Tables 61 and 63. See text and the Appendix for explanation of the derivation of these weighted sums.

TABLE 86. REGRESSION OF WEIGHTED THERAPEUTIC PROCEDURES AGAINST PATIENT SURVIVAL RISK FACTORS BY ENCOUNTER LOCATION (ESRD PATIENTS)[1]

| | ENCOUNTER LOCATION | | | |
|---|---|---|---|---|
| Variable | OFFICE OPD/CLINIC (B) | OUTPATIENT DIALYSIS UNIT (B) | INPATIENT DIALYSIS UNIT (B) | HOSPITAL INPATIENT (B) |
| (UNSTANDARDIZED REGRESSION COEFFICIENT) | | | | |
| Patient Age | 0.01 | < -0.01 | < 0.01 | -0.01 |
| Diabetes Mellitus | 0.31 | -0.03 | 0.99* | 0.22 |
| Neoplasms | 0.01 | 1.02* | -0.33 | -0.24 |
| Arteriosclerotic Heart Disease | 2.31 | 1.37* | 0.38 | 1.32* |
| Cerebral Vascular Accident | 1.03 | 0.34 | 1.36 | 0.24 |
| Chronic Obstructive Pulmonary Disease | -1.68 | -0.06 | -0.43 | -0.08 |
| (Constant) | 2.83 | 1.80 | 2.48 | 3.48 |
| (STANDARDIZED REGRESSION COEFFICIENT) | (Beta) | (Beta) | (Beta) | (Beta) |
| Patient Age | 0.04 | -0.01 | 0.01 | -0.03 |
| Diabetes Mellitus | 0.04 | -0.01 | 0.12* | 0.03 |
| Neoplasms | < 0.01 | 0.06* | -0.02 | -0.01 |
| Arteriosclerotic Heart Disease | 0.14 | 0.09* | 0.02 | 0.07* |
| Cerebral Vascular Accident | 0.02 | 0.01 | 0.03 | 0.01 |
| Chronic Obstructive Pulmonary Disease | -0.09 | < -0.01 | -0.02 | < -0.01 |

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[1] Reference category for patient survival risk factors is a patient who has none of the comorbid conditions listed above. Regression was simultaneous for all patient survival risk factors. Statistically significant predictors of weighted diagnostic tests are marked with an asterisk. The regression equation as a whole achieved statistical significance only for outpatient dialysis unit, where it explained 1% of the variance in the use of therapeutic procedures. Weighted sums of therapeutic procedures differ from the mean numbers of procedures employed in the regression shown in Tables 61 and 64. See text and the Appendix for explanation of the deviation of these weighted sums.

risk factors is slight; only the outpatient dialysis regression is significant, and the equation explains only 1% of the variance in the use of therapeutic procedures.

Following the introduction of stepwise variables in Table 87, none of the risk factors noted in Table 86 remain significant. In contrast to the regressions in Tables 83 and 85, measures of patient volume are not significant predictors of the use of therapeutic procedu in office, OPD/clinic, or hospital encounters (although weekly workload exerts a significant negative impact in the outpatient dialysis unit). Fee for service reimbursement (as opposed to capitation payment has a significant negative impact on the use of procedures in each location except the office-OPD/clinic, and institutional practice has a negative impact on procedure use for inpatient dialysis. For therapeutic procedures, all four regression equations were significant, with that of office-OPD/clinic explaining 13% of the variance, outpatie dialysis explaining 9%, inpatient dialysis 15%, and hospital inpatient 3%.

In Table 88, complexity of service is regressed against patient survival risk factors. Inexplicably, the only significant finding is the negative impact of arteriosclerotic heart disease on complexity in outpatient dialysis. As shown in Table 89, a large number of other variables are also significant predictors of complexity of service in outpatient dialysis; the positive predictors are led by physician age (with a beta of .20), whereas the leading negative predictors (group and institutional practice, with betas of -.18

TABLE 87. REGRESSION OF WEIGHTED THERAPEUTIC PROCEDURES AGAINST PATIENT SURVIVAL RISK FACTORS AND OTHER CHARACTERISTICS, BY ENCOUNTER LOCATION (ESRD PATIENTS)[1]

| | ENCOUNTER LOCATION | | | |
|---|---|---|---|---|
| Variable | OFFICE OPD/CLINIC (B) | OUTPATIENT DIALYSIS UNIT (B) | INPATIENT DIALYSIS UNIT (B) | HOSPITAL INPATIENT (B) |
| (UNSTANDARDIZED REGRESSION COEFFICIENT) | | | | |
| Patient Age | 0.02 | <-0.01 | < 0.01 | -0.01 |
| Diabetes Mellitus | 0.32 | < 0.01 | 0.76 | 0.19 |
| Neoplasms | 0.21 | 0.80 | -0.21 | -0.32 |
| Arteriosclerotic Heart Disease | 1.37 | 1.07 | 0.34 | 1.31 |
| Cerebral Vascular Accident | 2.45 | 0.40 | 1.09 | 0.22 |
| Chronic Obstructive Pulmonary Disease | -1.96 | -0.21 | 0.24 | 0.31 |
| CAPD | 1.79* | 2.08* | -- | -- |
| Internal Medicine Board | 1.37* | -- | -0.87* | -- |
| Home hemodialysis | 1.52* | -- | -- | -- |
| No board certification | -- | 1.01* | -- | -- |
| Institutional practice | -- | -0.57* | -1.00* | -- |
| Number of dailysis facilities | -- | -0.24* | -- | -- |
| Freestanding facility hemodialysis | -- | -0.32* | -1.16* | -- |
| Physician age | -- | 0.03* | -- | -- |
| Weekly workload | -- | <-0.01* | -- | -- |
| Non-Metropolitan practice | -- | -0.98* | -- | -0.99* |
| Fee for service reimbursement | -- | -0.41* | -1.51* | -1.22* |
| Dialysis facility owner | -- | -- | 0.97 | -- |
| Number of dialysis stations | -- | -- | -0.03* | -- |
| (Constant) | 1.18 | 1.59 | 4.32 | 3.78 |

TABLE 87. (CONTINUED)

| | ENCOUNTER LOCATION | | | |
|---|---|---|---|---|
| Variable | OFFICE OPD/CLINIC (Beta) | OUTPATIENT DIALYSIS UNIT (Beta) | INPATIENT DIALYSIS UNIT (Beta) | HOSPITAL INPATIENT (Beta) |
| (STANDARDIZED REGRESSION COEFFICIENT) | | | | |
| Patient Age | 0.10 | <-0.01 | 0.02 | -0.04 |
| Diabetes Mellitus | 0.04 | < 0.01 | 0.09 | 0.03 |
| Neoplasms | 0.01 | 0.04 | -0.01 | -0.02 |
| Arteriosclerotic Heart Disease | 0.08 | 0.07 | 0.02 | 0.07 |
| Cerebral Vascular Accident | 0.05 | 0.01 | 0.03 | 0.01 |
| Chronic Obstructive Pulmonary Disease | -0.10 | -0.01 | 0.01 | 0.01 |
| CAPD | 0.25* | 0.09* | -- | -- |
| Internal Medicine Board | 0.21* | -- | -0.13* | -- |
| Home hemodialysis | 0.17* | -- | -- | -- |
| No board certification | -- | 0.14* | -- | -- |
| Institutional practice | -- | -0.12* | -0.15* | -- |
| Number of dialysis facilities | -- | -0.10* | -- | -- |
| Freestanding facility hemodialysis | -- | -0.07* | -0.17* | -- |
| Physician age | -- | 0.09* | -- | -- |
| Weekly workload | -- | -0.08* | -- | -- |
| Non-Metropolitan practice | -- | -0.06* | -- | -0.08* |
| Fee for service reimbursement | -- | -0.05* | -0.18* | -0.13* |
| Dialysis facility owner | -- | -- | 0.10 | -- |
| Number of dialysis stations | -- | -- | -0.14* | -- |

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[1] Reference categories for dummy variable regression are a white (non-Hispanic) patient on hospital center hemodialysis, with none of the comorbid conditions listed above, who is being treated by a board-certified nephrologist in solo practice, who is located in a metropolitan area, does not own a dialysis facility, and is reimbursed under the alternate (capitation) plan. Regression was simultaneous for all parent survival risk factors, stepwise for all other characteristics. Statistically significant predictors of weighted therapeutic procedures are marked with an asterisk. (Stepwise variables sometimes lose statistical significance upon the entry of additional variables into the regression equation.) The regression equations as a whole were all statistically significant, with the regression for "Office, OPD/Clinic" explaining 13% of the variance in the use of therapeutic procedures, that for outpatient dialysis 9%, that for inpatient dialysis 15%, and that for hospital inpatient 3%. Weighted sums of therapeutic procedures differ from the mean numbers of procedures employed in the regression shown in Tables 61 and 64. See text and the Appendix for explanation of the derivation of these weighted sums.

TABLE 88. REGRESSION OF COMPLEXITY OF SERVICE AGAINST PATIENT SURVIVAL RISK FACTORS, BY ENCOUNTER LOCATION (ESRD PATIENTS)[1]

| | ENCOUNTER LOCATION | | | |
|---|---|---|---|---|
| Variable | OFFICE OPD/CLINIC (B) | OUTPATIENT DIALYSIS UNIT (B) | INPATIENT DIALYSIS UNIT (B) | HOSPITAL INPATIEN (B) |
| (UNSTANDARDIZED REGRESSION COEFFICIENT) | | | | |
| Patient Age | < -0.01 | <0.01 | <0.01 | < -0.01 |
| Diabetes Mellitus | 0.14 | 0.04 | 0.16 | -0.07 |
| Neoplasms | 0.76 | 0.28 | -0.37 | 0.03 |
| Arteriosclerotic Heart Disease | 0.36 | -0.28* | -0.04 | -0.26 |
| Cerebral Vascular Accident | 0.97 | 0.18 | 1.49 | -0.50 |
| Chronic Obstructive Pulmonary Disease | -0.80 | 0.11 | 0.05 | 0.36 |
| (Constant) | 3.09 | 1.97 | 2.40 | 3.48 |
| (STANDARDIZED REGRESSION COEFFICIENT) | (Beta) | (Beta) | (Beta) | (Beta) |
| Patient Age | -0.04 | <0.01 | 0.03 | -0.06 |
| Diabetes Mellitus | 0.06 | 0.02 | 0.05 | -0.03 |
| Neoplasms | 0.08 | 0.04 | -0.06 | 0.01 |
| Arteriosclerotic Heart Disease | 0.07 | -0.05* | -0.01 | -0.05 |
| Cerebral Vascular Accident | 0.06 | 0.01 | 0.09 | -0.05 |
| Chronic Obstructive Pulmonary Disease | -0.13 | 0.01 | <0.01 | 0.01 |

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[1] Reference category for patient survival risk factors is a patient who has none of the comorbid conditions listed above. Regression was simultaneous for all patient survival risk factors. Statistically significant predictors of complexity of service are marked with an asterisk. The regression equation as a whole achieved statistical significance only for outpatient dialysis unit, where it explained less than 1% of the variance in complexity of service.

TABLE 89. REGRESSION OF COMPLEXITY OF SERVICE AGAINST PATIENT SURVIVAL RISK FACTORS AND OTHER CHARACTERISTICS, BY ENCOUNTER LOCATION (ESRD PATIENTS)[1]

| | ENCOUNTER LOCATION | | | |
|---|---|---|---|---|
| Variable | OFFICE OPD/CLINIC (B) | OUTPATIENT DIALYSIS UNIT (B) | INPATIENT DIALYSIS UNIT (B) | HOSPITAL INPATIENT (B) |
| (UNSTANDARDIZED REGRESSION COEFFICIENT) | | | | |
| Patient Age | < -0.01 | <0.01 | <0.01 | <-0.01 |
| Diabetes Mellitus | 0.09 | 0.07 | 0.04 | -0.09 |
| Neoplasms | 0.52 | 0.30 | -0.33 | 0.08 |
| Arteriosclerotic Heart Disease | 0.29 | -0.36* | -0.10 | -0.15 |
| Cerebral Vascular Accident | 0.72 | 0.24 | 1.48 | -0.44 |
| Chronic Obstructive Pulmonary Disease | -0.38 | 0.04 | 0.49 | 0.04 |
| Number of dialysis patients | < -0.01* | <0.01* | -- | -- |
| Physician age | -- | 0.03* | -- | -- |
| Group practice | -- | -0.33* | -0.45* | -- |
| Institutional practice | -- | -0.36* | -0.59* | -- |
| Freestanding facility hemodialysis | -- | 0.27* | -0.27* | -- |
| No board certification | -- | 0.33* | -- | -- |
| Number of dialysis facilities | -- | 0.09* | -- | -- |
| CAPD | -- | 0.79* | -- | -- |
| Fee for service reimbursement | -- | 0.24* | -0.66* | -- |
| Non-Metropolitan practice | -- | 0.50* | -- | -- |
| Black patient | -- | -0.11* | -- | -- |
| Dialysis facility owner | -- | 0.12* | -- | -- |
| Internal Medicine Board | -- | -- | -0.72* | -- |
| Number of dialysis stations | -- | -- | -0.02* | -- |
| Weekly workload | -- | -- | < 0.01* | <-0.01* |
| No board certification | -- | -- | -- | 0.32* |
| (Constant) | 3.42 | 0.88 | 3.20 | 3.80 |

TABLE 89. (CONTINUED)

| Variable | ENCOUNTER LOCATION<br>OFFICE OPD/CLINIC (Beta) | OUTPATIENT DIALYSIS UNIT (Beta) | INPATIENT DIALYSIS UNIT (Beta) | HOSPIT INPATI (Beta |
|---|---|---|---|---|
| (STANDARDIZED REGRESSION COEFFICIENT) | | | | |
| Patient Age | -0.04 | 0.01 | 0.05 | -0. |
| Diabetes Mellitus | 0.04 | 0.03 | 0.01 | -0. |
| Neoplasms | 0.05 | 0.04 | -0.05 | 0. |
| Arteriosclerotic Heart Disease | 0.06 | -0.06* | -0.02 | -0. |
| Cerebral Vascular Accident | 0.04 | 0.02 | 0.09 | -0. |
| Chronic Obstructive Pulmonary Disease | -0.06 | 0.01 | 0.05 | 0. |
| Number of dialysis patients | -0.36* | 0.06* | -- | -- |
| Physician age | -- | 0.20* | -- | -- |
| Group practice | -- | -0.18* | -0.18* | -- |
| Institutional practice | -- | -0.19* | -0.24* | -- |
| Freestanding facility hemodialysis | -- | -0.15* | -0.11* | -- |
| No board certification | -- | 0.12* | -- | -- |
| Number of dialysis facilities | -- | 0.10* | -- | -- |
| CAPD | -- | 0.09* | -- | -- |
| Fee for service reimbursement | -- | 0.08* | -0.21* | -- |
| Non-Metropolitan practice | -- | 0.07* | -- | -- |
| Black patient | -- | -0.05* | -- | -- |
| Dialysis facility owner | -- | 0.05* | -- | -- |
| Internal Medicine Board | -- | -- | -0.29* | -- |
| Number of dialysis stations | -- | -- | -0.23* | -- |
| Weekly workload | -- | -- | 0.22* | -0. |
| No board certification | -- | -- | -- | 0. |

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[1] Reference categories for dummy variable regression are a white (non-Hispanic) patient on hospital center hemodialysis with none of the comor conditions listed above, who is being treated by a board-certified nephr logist in solo practice, who is located in a metropolitan area, does not a dialysis facility, and is reimbursed under the alternate (capitation) Regression was simultaneous for all patient survival risk factors, stepw for all other characteristics. Statistically significant predictors of plexity of service are marked with an asterisk. (Stepwise variables som times lose statistical significance upon the entry of additional variabl into the regression equation.) The regression equations as a whole were statistically significant, with the regression for "Office, OPD/Clinic" explaining 16% of the variance in complexity of service, that for outpat dialysis 18%, that for inpatient dialysis 27%, and that for hospital inpatient 7%.

and -.19) point to greater complexity of service for the reference group (solo practitioners), a finding which also holds for inpatient dialysis. Finally, there is no consistent impact of patient volume (number of dialysis patients and weekly workload) on complexity of service, and the amount of variance explained is greater than that for the other three dependent variables, with 16% for office-OPD/clinic, 18% for outpatient dialysis, 27% for inpatient dialysis, and 7% for hospital inpatient.

## Who Cares for High-Risk Patients?

In the analysis of patient survival risk factors by dialysis type (Table 79 above) it was shown that half of the patients on IPD were in the (high risk) 61 and over age group, whereas just 19-23% of self-care patients (home hemodialysis, CAPD, CCPD) fell into this group, with center/facility patients falling midway between these two extremes. The table also showed that diabetic patients were overrepresented in all types of peritoneal dialysis, but revealed no significant differences for non-diabetes medical complication by dialysis type. Here the question "Who cares for high-risk patients?" will be further explored by examining the three types of risk factors--patient age, diabetes mellitus, and non-diabetes medical complications--as a function of selected physician and practice characteristics.*

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*The physician and practice characteristics selected for inclusion in this analysis were originally used to examine workload and time allocation data in Table 5 and Tables 6 through 21, and were incorporated in the regressions shown in Tables 61 and 81.

These characteristics include demographic information such as the physician's age, practice arrangement, and board certification, as well as selected practice characteristics--the form of reimbursement for dialysis, number of dialysis patients, etc. Categories such as these provide the basis for determining whether high-risk patients are more likely to be cared for by physicians who are board certified in nephrology, by "high-volume" versus "low-volume" providers of dialysis care, and so forth. Following the procedure utilized in the regression analysis reported above, this analysis will differentiate patient encounters by their location: office-OPD/clinic, outpatient dialysis, inpatient dialysis, and hospital inpatient. However, in this case the analysis will also examine overall differences in risk factors by means of a "total" column that encompasses encounters in the four locations listed above, along with a small number of additional patient encounters that occur in locations such as the emergency room.

In Table 90 patient age is examined as a function of physician and practice characteristics. Here, mean patient age is used (as in the regression shown in Table 81) rather than the percentage of patients 61 years or older (as in Table 79) in order to reflect the full distribution of this variable (e.g., note differences at the low end of the frequency distributions in Table 70). As shown in the table, institutional physicians tend to care for a younger patient population than do their colleagues in office-based practice (although this effect is significant only for the two locations with the

## TABLE 90. PATIENT SURVIVAL RISK FACTORS BY PHYSICIAN/PRACTICE CHARACTERISTICS: I. MEAN PATIENT AGE (ESRD PATIENTS)[1]

| | ENCOUNTER LOCATION | | | | |
|---|---|---|---|---|---|
| PHYSICIAN/PRACTICE CHARACTERISTICS | OFFICE OPD/CLINIC (N=291) $\bar{X}$ | OUTPATIENT DIALYSIS UNIT (N=4264) $\bar{X}$ | INPATIENT DIALYSIS UNIT (N=569) $\bar{X}$ | HOSPITAL INPATIENT (N=1240) $\bar{X}$ | TOTAL[2] (N=6399) $\bar{X}$ |
| TOTAL | 50.8 | 53.2 | 53.0 | 54.5 | 53.4 |
| PRIMARY PRACTICE ARRANGEMENT | | | | | |
| Solo | 55.0 | 53.9 | 51.1 | 57.7 | 54.7 |
| Group | 50.0 | 54.0 | 54.1 | 54.5 | 53.9 |
| Institutional | 47.9 | 51.1 | 50.3 | 50.4 | 50.9 |
| *Statistical Significance* | *.023* | *.000* | *.072* | *.000* | *.000* |
| PHYSICIAN AGE | | | | | |
| Under 40 Years | 50.0 | 53.4 | 50.6 | 54.4 | 53.2 |
| 40 and Older | 52.3 | 53.4 | 54.8 | 54.1 | 53.6 |
| *Statistical Significance* | *.248* | *.965* | *.004* | *.762* | *.310* |
| BOARD CERTIFICATION BY AMERICAN BOARD OF INTERNAL MEDICINE (ABIM) AND NEPHROLOGY BOARD | | | | | |
| Not Board Certified | 55.8 | 51.9 | 48.8 | 55.5 | 52.7 |
| Certified by ABIM | 47.6 | 53.6 | 55.6 | 53.6 | 53.5 |
| Certified by ABIM and Nephrology Board | 51.5 | 53.4 | 52.6 | 54.6 | 53.5 |
| *Statistical Significance* | *.018* | *.113* | *.009* | *.391* | *.445* |
| NON-METROPOLITAN/METROPOLITAN PRACTICE | | | | | |
| Non-Metroplitan Area | 48.4 | 54.3 | --[3] | 57.0 | 54.3 |
| Metropolitan Area | 51.0 | 53.2 | 53.0 | 54.4 | 53.3 |
| *Statistical Significance* | *.447* | *.545* | *.959* | *.165* | *.392* |
| NUMBER OF DIALYSIS FACILITIES USED | | | | | |
| One | 50.1 | 52.1 | 54.7 | 55.1 | 52.9 |
| Two | 49.9 | 54.0 | 54.0 | 55.4 | 54.1 |
| Three or More | 52.0 | 53.6 | 49.6 | 52.9 | 53.1 |
| *Statistical Significance* | *.560* | *.003* | *.010* | *.054* | *.032* |

TABLE 90. (CONTINUED)

| | ENCOUNTER LOCATION | | | | |
|---|---|---|---|---|---|
| PHYSICIAN/PRACTICE CHARACTERISTICS | OFFICE OPD/CLINIC (N=291) $\bar{X}$ | OUTPATIENT DIALYSIS UNIT (N=4264) $\bar{X}$ | INPATIENT DIALYSIS UNIT (N=569) $\bar{X}$ | HOSPITAL INPATIENT (N=1240) $\bar{X}$ | TOTAL[2] (N=6399) $\bar{X}$ |
| REIMBURSEMENT FOR DIALYSIS | | | | | |
| Initial "Fee for Service" | 54.3 | 52.7 | 49.6 | 51.9 | 52.3 |
| Alternate "Capitation" | 50.7 | 53.3 | 53.9 | 55.0 | 53.6 |
| *Statistical Significance* | *.317* | *.430* | *.021* | *.023* | *.037* |
| OWNER OF DIALYSIS FACILITY | | | | | |
| Yes | 52.8 | 52.4 | 54.5 | 54.7 | 53.1 |
| No | 50.6 | 53.4 | 52.7 | 54.5 | 53.4 |
| *Statistical Significance* | *.383* | *.153* | *.414* | *.871* | *.549* |
| NUMBER OF STATIONS AT MOST FREQUENTLY-USED DIALYSIS FACILITY | | | | | |
| Low Quartile, 2-10 | 51.6 | 54.2 | 52.2 | 54.5 | 54.0 |
| Middle 50%, 11-23 | 50.3 | 52.9 | 52.0 | 54.5 | 53.1 |
| High Quartile, 24-54 | 51.3 | 53.3 | 54.1 | 54.4 | 53.5 |
| *Statistical Significance* | *.842* | *.141* | *.380* | *.994* | *.213* |
| NUMBER OF DIALYSIS PATIENTS | | | | | |
| 1-6 | --[3] | 46.6 | --[3] | --[3] | 47.4 |
| 7-84 | 51.7 | 53.6 | 53.7 | 55.0 | 53.8 |
| 85 or More | 49.0 | 52.7 | 52.0 | 53.4 | 52.7 |
| *Statistical Significance* | *.187* | *.001* | *.496* | *.135* | *.000* |
| WEEKLY WORKLOAD | | | | | |
| Low Quartile, 1-55 | 50.7 | 53.0 | 56.3 | 57.9 | 54.2 |
| Middle 50%, 56-150 | 51.1 | 53.0 | 50.3 | 53.0 | 52.6 |
| High Quartile, 151 or more | 50.3 | 53.4 | 55.9 | 56.2 | 54.0 |
| *Statistical Significance* | *.930* | *.616* | *.000* | *.001* | *.002* |

TABLE 90. (CONTINUED)

[1] See Table 79, footnote 1 for an explanation of how the diseases designated as "patient survival risk factors" are defined. The physician/practice characteristics included in this table conform to those used in the two series of regressions (Tables 61 and 81).

[2] The total column includes ESRD patient encounters that do not fall under any of the encounter location column headings shown in the table. Twenty-seven of these encounters occurred in the emergency room, four in nursing homes, one in the patient's home, and three in other locations (Table 34).

[3] Means or mean percentages for these cells are based on too small a case-base to provide reliable data. The smallest cell for which data are shown has an _n_ of 18.

largest n's--outpatient dialysis and hospital inpatient--as well as in the total column). Younger physicians and those who are not board certified also tend to care for younger patients in inpatient dialysis. The number of dialysis facilities used shows an inconsistent pattern between outpatient and inpatient dialysis, and measures of patient volume, though statistically significant, show no linear trend for patient age.

In Table 91, the percentage of patients with diabetes mellitus is distributed as a function of the same physician and practice characteristics. Here, there are only two significant differences; physicians who are not dialysis facility owners care for significantly more diabetic patients in the hospital, and there is a linear relationship between a physician's weekly workload and the percentage of diabetics seen in the office. Neither of these findings achieves significance in any other location or in the total column.

Finally, in Table 92, the percentage of patients with non-diabetic risk factors is presented. Following Table 79, this includes any patientwith a neoplasm, arteriosclerotic heart disease, a cerebral vascular accident, or chronic obstructive pulmonary disease. The total column shows that office-based physicians (solo and group practice) care for more high-risk patients than do institutional physicians, and that physicians who utilize just one dialysis facility and those who are not facility owners have higher percentages of high-risk patients. However, only for "number of dialysis facilities" is the finding both consistent and significant in more than one encounter location. It appears that physicians who care for greater percentages

TABLE 91. PATIENT SURVIVAL RISK FACTORS BY PHYSICIAN/PRACTICE CHARACTERISTICS: II. PERCENTAGE PATIENTS WITH DIABETES MELLITUS (ESRD PATIENTS)[1]

| | ENCOUNTER LOCATION | | | | |
|---|---|---|---|---|---|
| PHYSICIAN/PRACTICE CHARACTERISTICS | OFFICE OPD/CLINIC (N=291) % | OUTPATIENT DIALYSIS UNIT (N=4264) % | INPATIENT DIALYSIS UNIT (N=569) % | HOSPITAL INPATIENT (N=1240) % | TOTAL[2] (N=6399) % |
| TOTAL | 19.3 | 17.7 | 17.4 | 23.5 | 19.0 |
| PRIMARY PRACTICE ARRANGEMENT | | | | | |
| Solo | 21.2 | 15.7 | 25.0 | 24.0 | 18.7 |
| Group | 17.4 | 19.1 | 16.4 | 23.7 | 19.6 |
| Institutional | 23.4 | 16.0 | 16.7 | 22.2 | 17.3 |
| *Statistical Significance* | *.596* | *.025* | *.257* | *.872* | *.158* |
| PHYSICIAN AGE | | | | | |
| Under 40 Years | 20.7 | 18.0 | 21.3 | 25.4 | 20.2 |
| 40 and Older | 15.8 | 17.1 | 13.7 | 22.5 | 17.7 |
| *Statistical Significance* | *.339* | *.491* | *.019* | *.252* | *.012* |
| BOARD CERTIFICATION BY AMERICAN BOARD OF INTERNAL MEDICINE (ABIM) AND NEPHROLOGY BOARD | | | | | |
| Not Board Certified | 12.1 | 13.0 | 17.9 | 23.8 | 16.0 |
| Certified by ABIM | 19.3 | 18.2 | 15.6 | 20.1 | 18.4 |
| Certified by ABIM and Nephrology Board | 21.8 | 18.3 | 18.2 | 24.8 | 19.7 |
| *Statistical Significance* | *.443* | *.011* | *.757* | *.280* | *.036* |
| NON-METROPOLITAN/METROPOLITAN PRACTICE | | | | | |
| Non-Metropolitan Area | 10.0 | 17.3 | --[3] | 14.5 | 15.3 |
| Metropolitan Area | 20.7 | 17.6 | 17.5 | 24.1 | 19.0 |
| *Statistical Significance* | *.251* | *.938* | *.713* | *.054* | *.193* |
| NUMBER OF DIALYSIS FACILITIES USED | | | | | |
| One | 16.1 | 18.8 | 14.0 | 26.6 | 20.4 |
| Two | 18.9 | 16.2 | 18.2 | 22.0 | 17.4 |
| Three or More | 21.7 | 18.4 | 17.5 | 22.8 | 19.3 |
| *Statistical Significance* | *.617* | *.155* | *.538* | *.259* | *.048* |

TABLE 91. (CONTINUED)

| PHYSICIAN/PRACTICE CHARACTERISTICS | ENCOUNTER LOCATION | | | | |
|---|---|---|---|---|---|
| | OFFICE OPD/CLINIC (N=291) % | OUTPATIENT DIALYSIS UNIT (N=4264) % | INPATIENT DIALYSIS UNIT (N=569) % | HOSPITAL INPATIENT (N=1240) % | TOTAL$^2$ (N=6399) % |
| REIMBURSEMENT FOR DIALYSIS | | | | | |
| Initial "Fee for Service" | 27.8 | 21.1 | 14.7 | 23.6 | 20.8 |
| Alternate "Capitation" | 18.4 | 17.4 | 17.1 | 23.5 | 18.7 |
| *Statistical Significance* | *.326* | *.049* | *.572* | *.983* | *.171* |
| OWNER OF DIALYSIS FACILITY | | | | | |
| Yes | 23.8 | 17.5 | 19.0 | 16.8 | 17.6 |
| No | 17.6 | 17.8 | 16.6 | 25.4 | 19.1 |
| *Statistical Significance* | *.342* | *.857* | *.626* | *.007* | *.266* |
| NUMBER OF STATIONS AT MOST FREQUENTLY-USED DIALYSIS FACILITY | | | | | |
| Low Quartile, 2-10 | 8.9 | 18.6 | 14.4 | 17.6 | 17.8 |
| Middle 50%, 11-23 | 19.9 | 18.7 | 18.9 | 24.8 | 20.0 |
| High Quartile, 24-54 | 27.5 | 16.3 | 15.4 | 25.7 | 18.2 |
| *Statistical Significance* | *.086* | *.202* | *.488* | *.106* | *.147* |
| NUMBER OF DIALYSIS PATIENTS | | | | | |
| 1-6 | --$^3$ | 19.6 | --$^3$ | --$^3$ | 15.9 |
| 7-84 | 21.2 | 17.9 | 19.8 | 25.5 | 19.7 |
| 85 or More | 14.8 | 17.4 | 13.9 | 18.9 | 17.1 |
| *Statistical Significance* | *.455* | *.889* | *.055* | *.042* | *.038* |
| WEEKLY WORKLOAD | | | | | |
| Low Quartile, 1-55 | 10.0 | 18.4 | 12.3 | 26.2 | 18.4 |
| Middle 50%, 56-150 | 16.4 | 15.7 | 18.9 | 25.9 | 18.7 |
| High Quartile, 151 or more | 32.1 | 18.7 | 16.7 | 20.0 | 19.2 |
| *Statistical Significance* | *.005* | *.043* | *.457* | *.055* | *.868* |

TABLE 91. (CONTINUED)

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[1] See Table 79, footnote 1 for an explanation of how the diseases designated as "patient survival risk factors" are defined. The physician/practice characteristics included in this table conform to those used in the two series of regressions (Tables 61 and 81).

[2] The total column includes ESRD patient encounters that do not fall under any of the encounter location column headings shown in the table. Twent seven of these encounters occurred in the emergency room, four in nursin homes, one in the patient's home, and three in other locations (Table 34

[3] Means or mean percentages for these cells are based on too small a case-base to provide reliable data. The smallest cell for which data are sho has an n of 18.

TABLE 92. PATIENT SURVIVAL RISK FACTORS BY PHYSICIAN/PRACTICE CHARACTERISTICS: III. PERCENTAGE PATIENTS WITH NON-DIABETES RISK FACTORS - NEOPLASMS, ARTERIOSCLEROTIC HEART DISEASE, CEREBRAL VASCULAR ACCIDENT, OR CHRONIC OBSTRUCTIVE PULMONARY DISEASE (ESRD PATIENTS)[1]

| | ENCOUNTER LOCATION | | | | |
|---|---|---|---|---|---|
| PHYSICIAN/PRACTICE CHARACTERISTICS | OFFICE OPD/CLINIC (N=291) % | OUTPATIENT DIALYSIS UNIT (N=4264) % | INPATIENT DIALYSIS UNIT (N=569) % | HOSPITAL INPATIENT (N=1240) % | TOTAL[2] (N=6399) % |
| TOTAL | 8.8 | 7.3 | 9.6 | 11.9 | 8.4 |
| PRIMARY PRACTICE ARRANGEMENT | | | | | |
| Solo | 9.1 | 9.9 | 5.0 | 13.4 | 10.5 |
| Group | 7.6 | 7.5 | 10.6 | 12.3 | 8.8 |
| Institutional | 12.8 | 5.0 | 8.3 | 8.5 | 6.0 |
| *Statistical Significance* | *.535* | *.000* | *.346* | *.211* | *.000* |
| PHYSICIAN AGE | | | | | |
| Under 40 Years | 8.3 | 7.1 | 7.1 | 12.3 | 8.4 |
| 40 and Older | 8.9 | 7.5 | 11.0 | 11.2 | 8.4 |
| *Statistical Significance* | *.862* | *.598* | *.122* | *.539* | *.931* |
| BOARD CERTIFICATION BY AMERICAN BOARD OF INTERNAL MEDICINE (ABIM) AND NEPHROLOGY BOARD | | | | | |
| Not Board Certified | 6.1 | 9.3 | 3.8 | 7.8 | 8.3 |
| Certified by ABIM | 10.2 | 4.8 | 8.7 | 13.0 | 7.0 |
| Certified by ABIM and Nephrology Board | 8.2 | 7.7 | 11.6 | 12.5 | 9.0 |
| *Statistical Significance* | *.744* | *.001* | *.099* | *.157* | *.048* |
| NON-METROPOLITAN/METROPOLITAN PRACTICE | | | | | |
| Non-Metropolitan Area | 10.0 | 8.6 | --[3] | 13.2 | 10.0 |
| Metropolitan Area | 8.5 | 7.2 | 9.8 | 11.8 | 8.3 |
| *Statistical Significance* | *.817* | *.612* | *.352* | *.717* | *.412* |
| NUMBER OF DIALYSIS FACILITIES USED | | | | | |
| One | 12.6 | 11.1 | 12.0 | 14.3 | 11.9 |
| Two | 8.9 | 5.5 | 10.5 | 14.3 | 7.5 |
| Three or More | 4.7 | 5.9 | 5.6 | 7.6 | 6.2 |
| *Statistical Significance* | *.144* | *.000* | *.124* | *.003* | *.000* |

TABLE 92. (CONTINUED)

| | ENCOUNTER LOCATION | | | | |
|---|---|---|---|---|---|
| PHYSICIAN/PRACTICE CHARACTERISTICS | OFFICE OPD/CLINIC (N=291) % | OUTPATIENT DIALYSIS UNIT (N=4264) % | INPATIENT DIALYSIS UNIT (N=569) % | HOSPITAL INPATIENT (N=1240) % | TOTAL$^2$ (N=6399) % |
| REIMBURSEMENT FOR DIALYSIS | | | | | |
| Initial "Fee for Service" | 11.1 | 5.2 | 12.6 | 15.3 | 8.3 |
| Alternate "Capitation" | 8.2 | 7.6 | 9.4 | 11.8 | 8.6 |
| *Statistical Significance* | *.669* | *.056* | *.341* | *.214* | *.785* |
| OWNER OF DIALYSIS FACILITY | | | | | |
| Yes | 7.1 | 5.4 | 6.3 | 9.1 | 6.3 |
| No | 9.0 | 7.7 | 9.9 | 12.5 | 8.9 |
| *Statistical Significance* | *.694* | *.040* | *.364* | *.160* | *.010* |
| NUMBER OF STATIONS AT MOST FREQUENTLY-USED DIALYSIS FACILITY | | | | | |
| Low Quartile, 2-10 | 2.2 | 7.0 | 11.7 | 9.7 | 7.8 |
| Middle 50%, 11-23 | 9.4 | 7.7 | 7.0 | 12.3 | 8.7 |
| High Quartile, 24-54 | 10.0 | 6.9 | 11.1 | 12.5 | 8.4 |
| *Statistical Significance* | *.271* | *.635* | *.241* | *.611* | *.613* |
| NUMBER OF DIALYSIS PATIENTS | | | | | |
| 1-6 | --$^3$ | 1.8 | --$^3$ | --$^3$ | 1.2 |
| 7-84 | 7.9 | 7.5 | 12.3 | 12.4 | 8.9 |
| 85 or More | 11.1 | 7.3 | 6.9 | 12.1 | 8.3 |
| *Statistical Significance* | *.499* | *.262* | *.058* | *.648* | *.043* |
| WEEKLY WORKLOAD | | | | | |
| Low Quartile, 1-55 | 10.0 | 6.7 | 8.8 | 6.2 | 7.1 |
| Middle 50%, 56-150 | 10.9 | 8.3 | 9.3 | 11.0 | 9.3 |
| High Quartile, 151 or more | 2.6 | 6.5 | 10.5 | 13.8 | 7.8 |
| *Statistical Significance* | *.084* | *.100* | *.877* | *.110* | *.060* |

TABLE 92. (CONTINUED)

[1] See Table 79, footnote 1 for an explanation of how the diseases designated as "patient survival risk factors" are defined. The physician/practice characteristics included in this table conform to those used in the two series of regressions (Tables 61 and 81).

[2] The total column includes ESRD patient encounters that do not fall under any of the encounter location column headings shown in the table. Twenty-seven of these encounters occurred in the emergency room, four in nursing homes, one in the patient's home, and three in other locations (Table 34).

[3] Means or mean percentages for these cells are based on too small a case-base to provide reliable data. The smallest cell for which data are shown has an n of 18.

of high-risk patients tend to restrict their practice to fewer facilities than do those physicians who care for lower percentages of such patients.

Based on patient age plus the sum of non-diabetic risk factors, it is clear that office-based physicians care for significantly greater percentages of high-risk patients than do their institutional colleagues. There is also a tendency for physicians who care for high-risk patients to utilize fewer dialysis facilities (Table 92). Only one clear effect of patient volume was found--the higher percentages of diabetic patients in office visits with physicians who have higher weekly workloads (Table 91).

Equally notable are the effects that were not found. Board certification had an inconsistent and generally non-significant impact on the treatment of high-risk patients. Similarly, high-risk patients were not found to be concentrated in metropolitan areas or in larger (or smaller) dialysis facilities. With the exception of the practice arrangement and "number of facilities" differences noted above, it would appear that high-risk patients are not concentrated among particular providers of care or in unique practice settings, but rather that the patient populations are fairly uniform across most of the categories examined in Tables 90 through 92.

# SUMMARY AND CONCLUSIONS (EXECUTIVE SUMMARY)

The University of Southern California, Division of Research in Medical Education (USC/DRME), under a grant from the Health Care Financing Administration (HCFA), Department of Health and Human Services (DHHS), has conducted a nationwide survey of the professional activities of physicians who provide care for patients with end-stage renal disease (ESRD). The study was designed to obtain data on physicians' allocation of time to different professional activities, and on the patient populations treated by ESRD physicians, the problems those patients present, and the actions taken in response to those problems. The study utilized an existing survey research methodology (including a log-diary recording instrument) developed over a several year period at the University of Southern California and used in a previous nationwide survey of physicians in 24 medical and surgical specialties. The data reported here can therefore be compared directly to data from more than 10,000 physicians and surgeons presented in the report: Medical Practice in the United States.

The study population for the survey was defined as physicians who were affiliated with a dialysis facility providing care for ESRD patients under HCFA's Medicare alternate (capitation) reimbursement plan. A random sample of 300 facilities was drawn from a computerized list provided by HCFA. With the assistance of the End-Stage Renal Disease Networks, each facility sampled was sent a Physician Enumeration Form requesting the names of "physicians who regularly see dialysis patients through your facility, including the medical director. This should include any physician who sees patients currently receiving hemodialysis, CAPD, or other dialysis care. It excludes consultants (e.g., vascular surgeons) and physicians who see patients only irregularly, such as those who fill in for another physician less than once a month." A 91.4% response rate was achieved with this form, and the 926 physician names elicited from the facilities became the sampling universe for the ESRD physician survey. A 60% random sample of the physician names was drawn, for a sample size of 554; 336 of those sampled completed and returned the survey form, for a response rate of 65.2% (after removing the names of 39 physicians found to be ineligible for the study).

The survey instrument for the study was mailed to each physician in the sample, to be self-administered and returned to USC. In order to obtain a sufficient response rate to a mail survey of physicians, support from professional organizations was essential. Sponsorship was sought and obtained from the American Society of Nephrology, the American College of Physicians, the Task Force on Manpower of the Association of Professors of Medicine, and the Renal Physicians Association. Letters of endorsement from the latter three organizations were mailed to the survey sample just prior to the time that the survey instruments were mailed. In addition, a nationwide network of 25 "area representatives" was organized by the President of the Renal Physicians Association; these representatives aided the study by telephoning their colleagues in the study sample prior to and during the study week to encourage their participation. The study week for physicians in the Northeast, North Central, and Southern regions of the country was October 10-16, 1982; physicians in the West were assigned the study week of October 24-30, 1982. (The study weeks were staggered to avoid conflicts with major regional meetings of renal physicians.)

The survey instrument consists of a week's practice summary used to record practice activity (numbers of patients, hours worked) for the study week, followed by a three-section log-diary that was to be filled out for a three-day period during the study week. (Physicians were randomly assigned to either a Monday-Wednesday or Thursday-Saturday recording period. The resulting data from the log-diary represent a "typical day," excluding Sunday.) The three sections of the log-diary are an activity overview, used to code professional activities in 15-minute segments throughout the recording period; a telephone encounter form for recording details of telephone calls with patients; and an outpatient/inpatient form that was used to record information on each fact-to-face patient encounter. Finally, the instrument has a questionnaire that obtains information on the physician and on characteristics of his or her practice.

The demographic data collected in the survey show the study population to consist of 83.4% nephrologists or pediatric nephrologists, 14.8% internists, and 1.8% physicians from other specialties. A total of 68.7% are in office-based practice (solo, partnership, or group), 28.1% are institution-based, and 3.1% are in other practice arrangements. Board certification data show 81.0% of the respondents to be certified by the American Board of Internal Medicine (ABIM) and 53.6% by both ABIM and the Nephrology Subspecialty Board.

These figures differ substantially from the characteristics of respondents to USC's 1977 survey of nephrology. That study, which surveyed a random sample of nephrologists from the American Medical Association's Physician Masterfile, showed 31.2% in office-based practice, 19.5% institution-based, and 49.3% in an "other" category that includes non-patient care physicians. The 1977 nephrology survey also showed 58.0% of respondents to be certified by the ABIM. These and other statistics make it clear that ESRD physicians (as defined in the study's enumeration form) are substantially different from the overall population of nephrologists. Further data from the survey will be highlighted below, following the organization of the survey instrument: week's practice summary, activity overview, telephone encounters, and outpatient/inpatient encounters.

Data from the week's practice summary show that ESRD physicians have an average of 16.9 telephone calls with patients over a week's time, along with 65.7 outpatient and 47.0 inpatient encounters, for a total patient volume substantially higher than that for most internists.* The disaggregation of workload data by physician and practice characteristics shows that office-based physicians, those who care for higher numbers of dialysis patients, and those whose practices are incorporated all have higher numbers of both inpatient and outpatient encounters. A physician's outpatient volume was also found to be a function of the size of the dialysis facility, with outpatient loads among those affiliated with large facilities more than 50% greater than those for physicians affiliated with smaller facilities.

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*The 1977 nephrology survey showed 39.7 outpatient and 38.1 inpatient encounters, whereas USC's 1976 study of internal medicine showed 51.4 outpatient and 46.1 inpatient encounters.

The overall total of professional hours from the week's practice summary is 54.6 hours, with physicians under 40 years of age and those who are not board certified having significantly longer work weeks (57.1 hours and 60.3 hours, respectively). This finding, based on physician age and board certification, is particularly noteworthy because these sub-groups of physicians do not have higher patient volumes. It may be that the ability of older/board certified physicians to care for an equivalent patient volume in a shorter work week is partly a function of their greater experience and expertise in providing care for end-stage renal disease--particularly the more complex forms.

The activity overview shows that ESRD physicians spend 4.8 hours per day in patient care activities, 2.4 hours in other professional activities, 0.7 hours in administrative activities, 1.0 hours in professional travel, and an additional 4.1 hours in "on call" status. Thus, their Monday-Saturday professional day (excluding on call) is 8.9 hours long. Comparisons of activity overview data based on physician and practice characteristics show substantial differences in time allocation among sub-groups of ESRD physicians. Institution-based physicians devote approximately half as much time to patient care activities as do their colleagues in office-based practice (2.9 hours per day, compared to 6.1 for solo and 5.7 for group practitioners), and they also spend twice as much time in "other professional activities," especially teaching and research. Similarly, there is a trade-off between patient care and other activities for metropolitan and non-metropolitan physicians, with those in non-metropolitan areas devoting 1.6 more hours per day to patient care (6.3 hours versus 4.7 hours) and metropolitan physicians spending an average of 1.7 more hours in other professional activities.*

Other characteristics that differentiate physicians' allocation of time include workload (patient volume), the number of dialysis patients, and the number of dialysis facilities. The findings generally conform to what one would intuitively expect with regard to the effects of the characteristics on time allocation. For example, workload, measured in terms of the number of patients seen per week, strongly predicts the mean number of hours devoted to patient care; it is also associated with the length of the work day, with those falling into the highest workload quartile having an average Monday-Saturday work day of more than 10 hours (excluding "on call"). Physicians with the highest numbers of dialysis patients spend the most time in the dialysis unit; those with fewer spend significantly more time providing care in their offices. Finally, those who treat patients in more than one dialysis facility spend significantly more time in such facilities, as well as spending more time traveling between locations.

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*This category includes teaching, consultations, research, continuing education activities, and "other" (supervision of personnel, laboratory and other indirect care, and health-related committee activities, including patient record review).

Data on telephone encounters show that the majority (62%) of telephone calls are with non-ESRD patients. Drug orders or refills were involved in approximately one-third of the calls, and reporting or ordering tests in just over one-third. However, the major function of calls was to provide advice and/or directions to the patient; this was noted in almost three-fourths of calls.

The outpatient/inpatient data show that 58% of the face-to-face encounters are with ESRD patients. For ESRD patients, 66.6% of the encounters took place in the outpatient dialysis unit, 8.9% in the inpatient dialysis unit, 19.4% on hospital wards, and the remainder in other locations. Data on the form of maintenance dialysis for ESRD patients show that 39.5% of encounters are with patients on hospital-based center hemodialysis, 50.4% with patients on freestanding facility hemodialysis, and the rest as follows: home hemodialysis, 1.8%; CAPD, 4.9%; IPD, 2.7%; CCPD, 0.7%. The leading renal disease etiology for ESRD patients is primary hypertensive disease (at 27.7% of encounters), followed by glomerulonephritis (23.4%), diabetic nephropathy (18.2%), and polycystic kidney disease (6.6%). The etiology was unknown for 8% of ESRD patients. Data on frequency of encounters with these patients show that well over half of the ESRD patients are seen at least one time a week and that one-third of the patients are seen two to three times a week.

A bivariate and multivariate analysis of outpatient/inpatient encounter data was conducted that focused on the 6,411 encounters with ESRD patients. The bivariate analysis used four "structural" encounter variables--patient age (groups), race/ethnicity, type of dialysis, and encounter location--to partition data on the care provided by the physician. (The latter data include encounter time, the number of visits with the patient in the previous six months, the number of problems recorded, the diagnostic tests and therapeutic procedures employed, and so forth.) Patient age was the least significant predictor of other encounter variables, whereas type of dialysis was a powerful predictor of each of the other variables examined. The analysis showed greater percentages of severe and emergent problems for peritoneal dialysis patients, along with greater use of certain diagnostic tests for CAPD patients. The presentation in this analysis of both time per encounter and number of visits in six months suggests the possibility of creating a crude index of "total physician time for six months" by simply multiplying the two and transforming the sum of minutes into hours. The results of any such index from cross-sectional data have to be interpreted carefully (if, for example, certain types of dialysis treatments--say, CAPD--have more new patients). Even so, as shown below, the differences are pronounced.

| Type of Dialysis | Total Physician Hours per Patient for Six Months |
|---|---|
| Hospital-Based Center Hemodialysis | 7.5 |
| Freestanding Facility Hemodialysis | 5.7 |
| Home Hemodialysis | 3.0 |
| CAPD | 6.1 |
| IPD/CCPD | 7.2 |

These findings, depending as they do on physicians' retrospective estimates of the frequency of previous visits with their patients, should be corroborated by longitudinal patient-specific data. If the relationships shown above turn out to be accurate, however, there appears to be a substantial savings in physician time associated with home hemodialysis vis-a-vis both facility hemodialysis and other types of self-care dialysis.

The multivariate regression analysis sought to "explain" variation in the care provided to ESRD patients by regressing four variables that measure actions taken by the physician against a large number of both patient/encounter and physician/practice characteristics. The parameters of care selected for this analysis were time per encounter, the mean numbers of diagnostic tests and therapeutic procedures, and complexity of service. This analysis is a "structural" type of analysis that attempts to explain variation in these aspects of care by means of predictor variables, without reference to the actual clinical condition of the patient. The location of the patient encounter was an important predictor of the physician's actions, as little time and fewer tests and procedures were involved in encounters that occurred on dialysis rounds, whereas those in other locations (especially in the hospital) were associated with more resource-intensive care. The physician's workload, however, had an impact on the care provided even when other factors (e.g., encounter location) were controlled for; physicians with higher workloads tend to provide less resource-intensive care than their colleagues with lower workloads--with less time spent with the patient and fewer diagnostic tests. The number of therapeutic procedures utilized was found to be primarily a function of the number of problems the patient had at the time of presentation.

Findings from the initial-level analyses of ESRD patient encounter data prompted the researchers to embark on a supplemental analytic phase designed to further elucidate relationships suggested in the data. This supplemental analysis sought to (1) determine case-mix differences among patient populations on different types of renal dialysis, (2) incorporate clinical (diagnostic) information into a multivariate analysis of variation in the care provided to ESRD patients, and (3) answer the question: "Who cares for high-risk patients?" The first aspect of the analysis, prompted in part by the findings reported above, sought answers to the following two study questions. (1) Are there significant differences in the patient populations for different types of dialysis care (e.g., are there differences in patient demographics such as age); in particular are hospital-based dialysis centers caring for more "high-risk" patients than are freestanding facilities? (2) What are the differences in both patient characteristics and frequency of non-routine treatments for self-care patients, and between those on home hemodialysis and CAPD? The analysis examined ESRD patients' etiologies, and also their diagnoses, age, race/ethnicity, the location of the encounter, the type of care provided, and indices derived from these variables. Findings based on these variables can be summarized as follows:

- The ages of self-care patients (home hemodialysis, CAPD and CCPD) are all about the same, and these patients are 3-4 years younger than the overall mean age of ESRD patients. Hospital center hemodialysis patients are 1-1/2 years older than facility hemodialysis patients, although this difference becomes smaller with the introduction of statistical controls.

- Patients on IPD can be considered the sickest patient population; they are the oldest, they have the most problems recorded, they have the highest rates of serious systemic diseases (2-4 times that for center/facility hemodialysis), they have the highest percentage of hospitalization and the second highest percentage of specialized/consultative care, and (following the introduction of statistical controls) they have the highest percentage of non-Anglo patients. Conversely, the rates of serious systemic disease suggest that those on home hemodialysis are the least sick.

- Hospital-based center hemodialysis has a higher hospitalization rate than does freestanding facility hemodialysis, along with a somewhat older patient population (as noted above). Freestanding facility hemodialysis, in contrast, has substantially more non-Anglo patients and a much higher percentage of specialized/consultative care. However, there are are few discernible differences in the respective morbidity profiles except for somewhat higher rates of hypertension for freestanding facilities. Thus, with the exception of the higher hospitalization rate, there is little to support the contention that hospital-based centers care for sicker patient populations than do freestanding facilities.

The analysis of differences based on type of dialysis also incorporated indices of "non-routine" care. In addition to the percentage of encounters with hospitalized patients (incorporated into the case-mix findings reported above) potential indices of non-routine care include the percentage of encounters classed as urgent, the percentage in which a future hospital visit is anticipated, and the percentage in which a medical or surgical consultation is required. Urgent care is significantly higher for patients on CAPD and IPD, whereas surgical consultations are highest for home hemodialysis patients and future hospital visits are higher for home hemodialysis and all types of peritoneal dialysis (vis-a-vis patients on facility hemodialysis).

In order to determine the impact of medical complications on parameters of care, the second aspect of the supplemental analysis incorporated clinical (diagnostic) information into the analysis of variation in the care provided to ESRD patients. This was done by using patient age and etiological and diagnostic information to delineate "patient survival risk factors" identified by a major regional study of hemodialysis patient survival. Besides patient age, these risk factors are diabetes mellitus, neoplasms, arteriosclerotic heart disease, cerebral vascular disease, and chronic obstructive pulmonary disease. These risk factors were entered into regression equations with encounter time, weighted sums of diagnostic tests and therapeutic procedures, and complexity of service as dependent variables.

Results of the regressions (which were computed separately for office-OPD/clinic encounters, outpatient dialysis, inpatient dialysis, and hospital encounters) show that, whereas patient survival risk factors had no impact upon patterns of care in the office-OPD/clinic, arteriosclerotic heart disease is associated with the use of significantly more diagnostic tests and therapeutic procedures in outpatient dialysis. For inpatient dialysis, diabetes mellitus is associated with the use of more tests and procedures, and arteriosclerotic heart disease is associated with a significant increase in time spent with the patient (an additional 6.5 minutes per encounter). Finally, arteriosclerotic heart disease is also associated with the use of more therapeutic procedures for hospital inpatients.

With separate regressions utilized for different locations and the effects of medical complications controlled for, the tendency of physicians with high workloads to provide less resource-intensive care (as noted above) was corroborated; physicians with high workloads spend less time with their patients and utilize fewer diagnostic tests in all locations except the inpatient dialysis unit. In outpatient dialysis units, physicians with high workloads also use fewer therapeutic procedures.

Finally, the third aspect of the supplemental analysis, which sought to answer the question "Who cares for high risk patients?", found few significant indications that high risk patients were concentrated in certain kinds of care settings or were being treated by certain categories of providers. One clear finding is that office-based physicians care for significantly greater percentages of high-risk patients than do their institution-based colleagues. Conversely, other variables that one might expect to have an impact on this dimension of care did not. For instance, board certification had an inconsistent and generally non-significant impact on the treatment of high-risk patients. Similarly, high-risk patients were not found to be concentrated in metropolitan areas or in larger (or smaller) dialysis facilities.

The findings summarized above constitute the most comprehensive data ever collected on the professional activities of ESRD physicians. These physicians present a unique demographic profile, and their workloads (patient volume and time spent in patient care activities) parallel the busy practices of generalist physicians more than they do the practice patterns of most subspecialists in internal medicine (except that the outpatient load occurs mainly in the dialysis unit). Patient encounter data show that the majority of their visits are with ESRD patients, and that over half of all ESRD patients (facility and self care combined) are seen once a week or more. ESRD physicians report seeing facility hemodialysis patients an average of between

1.6 and 1.7 times a week. The telephone is used primarily for communicating with other health professionals, and calls with patients are primarily with non-ESRD patients. There are pronounced differences in the morbidity profiles of patients on different types of dialysis; home hemodialysis patients were found to have low rates of serious systemic illnesses, whereas peritoneal dialysis patients have high rates of diabetes mellitus. IPD patients are the sickest patients on a number of criteria, but there is little evidence to indicate that patients treated in hospital-based hemodialysis centers are any sicker than those in freestanding facilities. Finally, physicians with the highest workloads provide less resource-intensive care (less time spent with the patient and fewer diagnostic tests employed) even when medical complications and other sources of variation in care are controlled for statistically.

## Recommendations for Additional Research

USC's ESRD study has employed a cross-sectional survey design to obtain information from a scientifically-selected sample of physicians. The resulting data from the log-diary, when aggregated across all participants, represent a "typical day" in their practices in terms of the characteristics of the patients seen, the locations where they are seen, the problems the patients have, and the actions taken by the physician in response to those problems. This "slice of life" then permits the valid comparison of certain sub-groups of ESRD patient encounters with regard to patient characteristics, the presence of medical complications, and (especially) the resource-intensity of the care provided in terms of percentage of hospitalizations, time spent by the physician, and diagnostic and therapeutic procedures utilized.

Whereas these comparisons are valid (within the limitations set forth in the study's Final Report), they tell us nothing about the clinical history of certain sub-groups of patients (e.g., patients on CAPD). It may be, for instance, that a given phenomenon (e.g., hospitalizations for peritonitis), which applies to a certain proportion of a population on a "typical day," may be disproportionately accounted for by certain individuals who are hospitalized repeatedly while others are hospitalized at a rate far lower than the overall norm. Assuming such a phenomenon were true, the resource-intensity of the former group of patients could not be distinguished from that of the latter by means of cross-sectional data on patient encounters.

For this reason, our recommendation for additional study of dialysis care is a longitudinal (cohort) study of ESRD physicians' patients that monitors the care provided over a six-month to one-year period. As with the current cross-sectional survey, this would be a physician-centered study in which participants recorded data on selected patients at periodic intervals. Data elicited by the proposed survey would center on key parameters of the care being provided (how often seen for how long, in what location, and the tests and procedures employed) as well as changes in the patient's prognosis. Such a study would be capable of determining the total "resources" utilized in caring for patients under different types of dialysis care (and thus form the basis for policy decisions related to incentives and disincentives attached to dialysis modalities), would also elucidate the trade-offs of different types of medical resources in ESRD care (e.g., is the use of frequent diagnostic testing in effect substituted for physician time?), and would establish whether the level of resource intensity (especially physician time) actually bears any relationship to changes in the patient's prognosis (or vice-versa).

Besides providing a definitive test of the resource intensity involved in different types of dialysis care, the proposed study would overcome three limitations in the conclusions that can be drawn from the findings presented here. First, the "number of visits in the last six months" data collected in the survey and used to estimate differences in total physician time by dialysis type (above) relies on a retrospective estimate by the physician. Retrospective estimates are subject to problems of recall and other sources of bias, and are generally considered to be the least reliable type of information gathered by means of survey research. By incorporating periodic data collection intervals, the longitudinal survey would considerably shorten the period subject to recall (e.g., two weeks rather than six months) and thus produce substantially more reliable data upon which to base estimates of the total expenditure of physician time.

Secondly, the longitudinal study would allow us to determine not only the percentage of patients on a particular type of dialysis who are hospitalized at any given time, but the length of their stay. This would lend further specificity to the comparison between hospital-based dialysis centers and freestanding facilities. In the present study, it was found that patients on hospital center hemodialysis had higher percentages of encounters in inpatient dialysis units and hospital wards. Data on length of stay would enable us to determine whether this higher rate of hospitalization is a function of a greater tendency to hospitalize patients dialyzing in hospital-based centers (in which case we would expect to find significantly shorter hospital stays) or a function of a sicker patient population (in which case we would expect to find that hospital stays are as long or longer than those for freestanding facility patients).

Finally, the third improvement in the interpretation of the current findings that could be gained by means of a longitudinal data collection scheme has to do with the patient survival risk factors utilized in the present study. The risk factors were originally determined by examining long-term survival differences for different categories of hemodialysis patients, and they do have some value for comparing the prevalence of medical complications among sub-groups of dialysis patients. At the same time, among populations of long-term dialysis patients, those at greatest risk will have died, so if newer patients tend to be assigned to certain treatment modalities (e.g., CAPD) these latter groups will disproportionately represent high-risk patients. The use of a longitudinal design (even if it is just six months) will allow us to follow a cohort of patients and substitute actual survival for projected survival based on risk factors.

In sum, we believe that the recommended study will augment the findings presented here in several crucial areas--resource use, total physician time, duration of hospitalizations, and patient survival. At the same time, we feel that the present study constitutes the most rigorous, comprehensive examination of the professional activities of ESRD physicians ever conducted, and that it will serve as a useful data source for all parties interested in the physician's role in providing ESRD care.

# APPENDICES

Physician Enumeration Form

Log-Diary Recording Form

Comparison of Two Days of Data

Coding of Complexity of Service

Patient Race, Dialysis Type and Renal Disease Etiology

Derivation of Weighted Diagnostic Tests and Therapeutic Procedures

Questionnaire

Individual Profile of Practice

# PHYSICIAN ENUMERATION FORM

University of Southern California
School of Medicine
Renal Disease Practice Study

# PHYSICIAN ENUMERATION FORM

Date form Completed
/ / 1982

**Dialysis Facility**

**Facility Address Correction:**

Address

City State ZIP

**Medical Director:**

M.D.
Name

Office Address

Address (cont.)

City State ZIP

area ( )
Business Telephone

**Instructions:** Please record the number of physicians who regularly see dialysis patients through your facility, including the medical director. This should include any physician who sees patients currently receiving hemodialysis, CAPD, or other dialysis care. It excludes consultants (e.g., vascular surgeons) and physicians who see patients only irregularly, such as those who fill in for another physician less than once a month. Please print or type the physicians' names, office addresses, and telephone numbers in the spaces provided.

Number of Physicians ______

**Physicians:**

M.D.
Name

Office Address

Address (cont.)

City State ZIP

area ( )
Business Telephone

**Physicians:**

M.D.
Name

Office Address

Address (cont.)

City State ZIP

area ( )
Business Telephone

(Additional listings on reverse)

# LOG-DIARY RECORDING FORM[*]

[*] Recording forms are reduced in size from the originals.

# RENAL DISEASE PRACTICE STUDY

James Smith MD
Nephrology Clinic
10 Main Street
Anytown USA 00000

**RETURN COMPLETED BOOKLET TO:**

Robert C. Mendenhall, Project Director
Medical Activities and Manpower Projects
Division of Research in Medical Education
USC School of Medicine
221 Keith Administration Building
2025 Zonal Avenue
Los Angeles, California 90033

**RETURN POSTAGE GUARANTEED**

If the address of your primary practice location is not the same as the address shown on the above mailing label, record the address of your primary practice location below:

Street

City State Zip

**ASSIGNED STUDY WEEK (PART I)**

| | | | |
|---|---|---|---|
| SUNDAY<br>OCT. 24 | THRU | SATURDAY<br>OCT. 30 | G2 |

| | | |
|---|---|---|
| THURSDAY<br>OCT. 28 | FRIDAY<br>OCT. 29 | SATURDAY<br>OCT. 30 |

**DETAILED RECORDING DAYS (PART II)**

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Dear Doctor:

Through three separate letters of endorsement from the organizations that most fully represent you and your area of medical specialization, you know that you have been selected to be a participant in our nationwide survey of renal disease specialists. In addition to these letters, you have been (or will be) contacted by one of your colleagues whose mission it is to explain any aspects of the study which may not be clear and to underscore the importance of the survey in providing practice-relevant information for future educational and manpower planning for the specialty. I would like to take this opportunity to elaborate upon the rationale for the study and, at the same time, point out its usefulness to you — both directly and indirectly.

The participation of you and others who have been selected on a scientific sampling basis in this national renal disease practice study will yield the data which are required to describe the practice of renal disease medicine on a national, a regional and community basis. The study has been deliberately designed to draw participants from the range of practices — from those almost exclusively involved in renal disease care to those with very few patients receiving this type of care. Thus, the data which we will obtain will provide the broadest possible view of the professional activities of physicians providing care for renal disease as well as clinical details pertaining to each patient seen during the study period.

The study is sponsored by the Health Care Financing Administration. It is endorsed by the American College of Physicians, the Task Force on Manpower of the Association of Professors of Medicine, The American Society of Nephrology, and the Renal Physicians Association. These organizations have lent their support in recognition of the need for accurate, practice-relevant information on renal disease care that can serve as a guide to decision-making in both educational program development and manpower planning. They recognize that, with or without such information, plans and policies affecting care for renal disease are being made and will continue to be made. But for any type of planning, facts are always better than "best judgements" or estimates. This study will provide the facts for renal disease care.

The study's findings will be made available upon completion of the survey. However, no individual, group, or agency aside from the USC study team will have access to your own survey responses without your specific authorization. The only published information will be based on group responses so that your anonymity will be scrupulously protected.

When the data are analyzed you will be sent, if so desired, a copy of your individual practice profile along with comparable statistical results for the national profile. This can be extremely valuable to you in your own educational and staffing plans. This profile does not come "free of charge" for it is obvious that it will take time out of your daily practice to accurately complete the study. To obtain the profile, just check the appropriate box at the end of this booklet.

If you have any questions or concerns, please call us collect at (213) 224-7912, Monday through Friday, 7:00 a.m. to 4:00 p.m. (Pacific Time). My staff and I will be happy to help you.

Sincerely,

Robert C Mendenhall

Robert C. Mendenhall, Director
Medical Activities and Manpower Projects

# GENERAL INSTRUCTIONS

PLEASE REVIEW THE ENTIRE BOOKLET BEFORE YOU BEGIN

This booklet consists of three parts. Each part should be completed at the times indicated below:

**PART I: WEEK'S PRACTICE SUMMARY** – Record for Assigned Study Week Indicated on the cover. Part I is a one-page summary of your daily patient encounters, telephone calls, and professional hours for this seven-day period.

**PART II: LOG-DIARY** – Record ONLY for the three Detailed Recording Days indicated on the cover. Part II consists of three sections:

Section A: Activity Overview – For recording time devoted to professional and other activities during this three-day period.

Section B: Patient Encounters – Telephone – For recording calls between you and your patients regarding clinical and/or counseling services during this three-day period.

Section C: Patient Encounters – Outpatient/Inpatient – For recording information on those patients you see for clinical and/or counseling services during this three-day period.

**PART III: QUESTIONNAIRE** – Complete at any time prior to the end of your Assigned Study Week. Part III focuses on several aspects of your background and current practice situation.

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Please record your activities only during the times indicated on the cover. These particular time periods have been selected at random for statistical purposes. Even if these time periods are not typical of your usual practice (e.g., due to days off, vacation, attendance at seminars), DO NOT SELECT ALTERNATIVE DAYS WHICH SEEM TO BE MORE REPRESENTATIVE OF YOUR PRACTICE.

To save yourself time, review the entire booklet before your Assigned Study Week. Parts I and II contain special instructions and examples. Be sure to read these special instructions and examples carefully before completing each part. Our experience shows that prior familiarization with instructions, and particularly with the various codes used in recording, will save you time in completing the booklet.

It should not be necessary to consult patient records to complete this booklet. However, some of the information requested may be more easily provided by your staff. Please involve them in whatever way makes the completion of the booklet easiest for you. If you have any questions or problems, be sure to call us collect Monday through Friday, 7:00 a.m. to 4:00 p.m. (Pacific Time).

(213) 224–7912

Upon completion, return the booklet as soon as possible in the Postage-Paid envelope provided.

## PART I: WEEK'S PRACTICE SUMMARY

**INSTRUCTIONS** Part I focuses on an entire week of your practice — the seven-day study period assigned to you on the front cover of this booklet. Recording for Part I begins on the SUNDAY of your Assigned Study Week and ends on the following SATURDAY. This seven-day period includes the three days you will also be recording in Part II. Do not choose other days to record your activities.

YOUR STAFF MAY BE ABLE TO COMPLETE MOST OF THIS FORM.

To complete Part I, insert the date in the space provided and record the total number of each of the following on a daily basis:

TELEPHONE CALLS WITH HEALTH PROFESSIONALS — conversations between you and other health professionals regarding clinical and/or counseling services to patients. Include conversations with consultants and pharmacists. Do not include personal calls or calls handled exclusively by other staff.

TELEPHONE CALLS WITH PATIENTS — professional conversations between you and patients or members of patients' families involving clinical and/or counseling services. This does not include personal calls or calls from patients solely to schedule appointments. Also, do not include calls handled exclusively by other staff.

PATIENTS SEEN BY YOU: OUTPATIENTS — face-to-face contacts in which you provide clinical and/or counseling services to outpatients.

PATIENTS SEEN BY YOU: INPATIENTS — face-to-face contacts in which you provide clinical and/or counseling services to inpatients. *Multiple contacts with the same patient during a day should be recorded as separate encounters.*

PATIENTS SEEN BY NON-PHYSICIAN STAFF ONLY — face-to-face contacts in which non-physician staff provide the total clinical and/or counseling services to patients during a visit.

At the end of each day, insert the total number of telephone calls or patient encounters of each type in the small boxes provided (see example). Do not leave any of these small boxes blank — use "0" where appropriate. You may either use the area outside these small boxes for tallying or consult some other source of information to determine the totals.

A separate column is provided for recording your TOTAL PROFESSIONAL HOURS. Here you are asked to write in the number of hours you spent each day involved in professional activities including travel (i.e., those activities coded 1-25 on the Activity Overview [Part II, Section A]). Do not include hours spent "on call". Your best estimate of the number of professional hours per day is sufficient.

Finally, a box is provided in the lower right-hand corner for you to estimate your usual number of patient encounters for a typical week. *Consider multiple contacts with the same patient as separate encounters.*

| DAY OF THE WEEK | TELEPHONE CALLS WITH HEALTH PROFESSIONALS | TYPES OF PATIENT ENCOUNTERS | | | | TOTAL PROFESSIONAL HOURS (Excluding On Call) |
|---|---|---|---|---|---|---|
| | | TELEPHONE CALLS WITH PATIENTS | PATIENTS SEEN BY YOU OUTPATIENTS | PATIENTS SEEN BY YOU INPATIENTS | PATIENTS SEEN BY NON-PHYSICIAN STAFF ONLY | |
| SUNDAY<br>9/19/82<br>Mo Day Yr | [0] | [0] | [0] | [0] | [0] | 0 |
| MONDAY<br>9/20/82<br>Mo Day Yr | 𝍸 \|<br>[6] | 𝍸 \|<br>[6] | 𝍸 𝍸 \|\|\|<br>[13] | 𝍸 \|\|\|<br>[8] | 𝍸 \|<br>[6] | 9 |
| TUESDAY<br>9/21/82<br>Mo Day Yr | 𝍸 \|<br>[6] | 𝍸<br>[5] | 𝍸 𝍸 𝍸 \|\|<br>[17] | 𝍸 𝍸 \|<br>[11] | \|\|<br>[2] | 11 |
| WEDNESDAY<br>9/22/82<br>Mo Day Yr | \|\|<br>[2] | \|\|\|<br>[3] | 𝍸 \|\|\|<br>[8] | 𝍸<br>[5] | [0] | 5 |
| THURSDAY<br>9/23/82<br>Mo Day Yr | \|\|\|\|<br>[4] | 𝍸<br>[5] | 𝍸 𝍸 \|\|\|\|<br>[14] | 𝍸 \|\|\|<br>[8] | 𝍸 \|\|<br>[7] | 11 |
| FRIDAY<br>9/24/82<br>Mo Day Yr | \|\|\|<br>[3] | 𝍸 \|<br>[6] | 𝍸 𝍸 𝍸 \|\|<br>[17] | 𝍸 𝍸<br>[10] | 𝍸<br>[5] | 12 |
| SATURDAY<br>9/25/82<br>Mo Day Yr | \|\|\|\|<br>[4] | [0] | [0] | 𝍸 \|<br>[6] | [0] | 2.5 |

*IF NO PATIENT ENCOUNTERS OCCUR ON A GIVEN DAY, RECORD "0" IN THE SMALL BOX PROVIDED AS ILLUSTRATED IN THE EXAMPLE.*

| DAY OF THE WEEK | TELEPHONE CALLS WITH HEALTH PROFESSIONALS | TYPES OF PATIENT ENCOUNTERS | | | | TOTAL PROFESSIONAL HOURS (Excluding On Call) |
|---|---|---|---|---|---|---|
| | | TELEPHONE CALLS WITH PATIENTS | PATIENTS SEEN BY YOU: OUTPATIENTS | PATIENTS SEEN BY YOU: INPATIENTS | PATIENTS SEEN BY NON-PHYSICIAN STAFF ONLY | |
| SUNDAY<br>__/__/__<br>Mo. Day Yr. | ☐ | ☐ | ☐ | ☐ | ☐ | |
| MONDAY<br>__/__/__<br>Mo. Day Yr. | ☐ | ☐ | ☐ | ☐ | ☐ | |
| TUESDAY<br>__/__/__<br>Mo. Day Yr. | ☐ | ☐ | ☐ | ☐ | ☐ | |
| WEDNESDAY<br>__/__/__<br>Mo. Day Yr. | ☐ | ☐ | ☐ | ☐ | ☐ | |
| THURSDAY<br>__/__/__<br>Mo. Day Yr. | ☐ | ☐ | ☐ | ☐ | ☐ | |
| FRIDAY<br>__/__/__<br>Mo. Day Yr. | ☐ | ☐ | ☐ | ☐ | ☐ | |
| SATURDAY<br>__/__/__<br>Mo. Day Yr. | ☐ | ☐ | ☐ | ☐ | ☐ | |

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*Estimate the total number of outpatient/inpatient encounters you personally have during a typical week. If you do not normally see patients, record "0".* ☐

PART I: WEEK'S PRACTICE SUMMARY

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# PART II, SECTION A: ACTIVITY OVERVIEW

**INSTRUCTIONS** The Activity Overview is designed to provide information regarding your daily allocation of time to various activities. COMPLETE THIS SECTION FOR EACH OF THE THREE DETAILED RECORDING DAYS INDICATED ON THE FRONT COVER. Do not select other days to record your activities.

Each day is divided into 15-minute intervals. For each interval, select the ONE Activity Code on the right that best describes your activities during that period of time.

If you were engaged in more than one activity during the interval, code the one which describes what you did for the majority of the time. If an activity continued through more than one interval, indicate this using arrows as illustrated in the example below.

Note that the recording day begins at Midnight. Activity Code No. 29 applies to time spent sleeping and eating, as well as to all other personal activities.

Use a separate page for each of your three recording days. As you start each new page, insert the date in the space provided.

RECORD ONLY ONE ACTIVITY CODE FOR EACH TIME PERIOD.

9/20/82
Mo Day Yr.
Date

| BEGIN TIME | ACTIVITY CODE | BEGIN TIME | ACTIVITY CODE | BEGIN TIME | ACTIVITY CODE | BEGIN TIME | ACTIVITY CODE |
|---|---|---|---|---|---|---|---|
| Midnight | 29 | AM 6 00 | 29 | Noon | 21 | PM 6 00 | 29 |
| AM 12 15 | ↓ | AM 6 15 | ↓ | PM 12 15 | ↓ | PM 6 15 | ↓ |
| AM 12 30 | ↓ | AM 6 30 | ↓ | PM 12 30 | ↓ | PM 6 30 | ↓ |
| AM 12 45 | ↓ | AM 6 45 | 25 | PM 12 45 | ↓ | PM 6 45 | 25 |
| AM 1 00 | ↓ | AM 7 00 | 23 | PM 1 00 | ↓ | PM 7 00 | 8 |
| AM 1 15 | ↓ | AM 7 15 | 8 | PM 1 15 | ↓ | PM | ↓ |
| AM 1 30 | ↓ | AM 7 30 | ↓ | PM 1 30 | ↓ | PM | ↓ |
| AM 1 45 | ↓ | AM 7 45 | ↓ | PM 1 45 | 25 | PM | ↓ |
| AM 2 00 | ↓ | AM 8 00 | 23 | PM 2 00 | 23 | PM | ↓ |
| AM 2 15 | ↓ | AM [illegible] | 25 | [illegible] | 24 | PM | 25 |
| AM 2 30 | ↓ | [illegible] | 23 | PM [illegible] | ↓ | PM | [illegible] |
| AM 2 45 | ↓ | AM 8 45 | 24 | PM 2 [illegible] | ↓ | PM | 29 |
| AM 3 00 | ↓ | AM 9 00 | ↓ | PM | ↓ | PM | ↓ |
| AM 3 15 | ↓ | [illegible] | 13 | PM | ↓ | [illegible] | ↓ |
| AM 3 30 | ↓ | [illegible] 9 30 | ↓ | PM | ↓ | PM 9 30 | ↓ |
| AM 3 45 | ↓ | A[illegible] 9 45 | 1 | PM | 24 | PM 9 45 | ↓ |
| AM 4 00 | ↓ | A[illegible] 00 | ↓ | PM 4 00 | 5 | PM 10 00 | ↓ |
| AM 4 15 | ↓ | [illegible] | ↓ | PM 4 15 | ↓ | PM 10 15 | ↓ |
| AM 4 30 | ↓ | AM 10 30 | ↓ | PM 4 30 | ↓ | PM 10 30 | ↓ |
| AM 4 45 | ↓ | AM 10 45 | ↓ | PM 4 45 | 2 | PM 10 45 | ↓ |
| AM 5 00 | ↓ | AM 11 00 | ↓ | PM 5 00 | 24 | PM 11 00 | ↓ |
| AM 5 15 | ↓ | AM 11 15 | ↓ | PM 5 15 | 27 | PM 11 15 | ↓ |
| AM 5 30 | ↓ | AM 11 30 | 2 | PM 5 30 | ↓ | PM 11 30 | ↓ |
| AM 5 45 | ↓ | AM 11 45 | 23 | PM 5 45 | 25 | PM 11 45 | ↓ |

## ACTIVITY CODE

PATIENT CARE
- [illegible] treatments
- [illegible] ca[illegible]
- 3. Hon[illegible] school visits
- 4. OPD [illegible] and treatments
- 5. Dialys[illegible] · ou[illegible]
- 6. Dialys[illegible]it · inp[illegible]
- 7. [illegible]ncy room
- [illegible]spital · on wards [illegible]ily rounds)
- Hospital · in surgery
- Hospital · OB deliver[illegible]
- Extended care facility (Nursing home)
- [illegible] Teaching rounds

OTHER PROFESSIONAL
- 13. Consultations
- 14. Supervision of personnel
- 15. Laboratory and other indirect care
- 16. Patient education
- 17. Teaching - other
- 18 Teaching related: Meetings specific document research, materials
- 19. Research
- 20 Research related: Meetings fiscal, personnel, specific document analysis
- 21. Continuing education: National/regional meetings, courses, self-instruction, professional journals
- 22. Health-related committee activities, including patient record review

ADMINISTRATION
- 23. Patient related: Charts, billing, insurance forms, lab reports, pharmacy, medical/legal
- 24. Other: Dictating, salesmen, purchasing, personnel and management

PROFESSIONAL TRAVEL
- 25. Travel: Enroute to hospital, office, meetings, etc.

OTHER
- 26. On call (use only if you are on call and one of the other codes in this list is not applicable)
- 27. Completion of this survey instrument
- 28 Civic activities, service clubs
- 29. Personal - not on call

SAMPLE

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# PART II, SECTION A: ACTIVITY OVERVIEW

**INSTRUCTIONS** For each time interval, select the ONE Activity Code on the right that best describes your activities during that period. Use arrows to indicate activities continued through more than one interval. Insert today's date in the space provided.

__/__/__
Mo. Day Yr.
Date

| BEGIN TIME | ACTIVITY CODE | BEGIN TIME | ACTIVITY CODE | BEGIN TIME | ACTIVITY CODE | BEGIN TIME | ACTIVITY CODE |
|---|---|---|---|---|---|---|---|
| Midnight | | AM 6:00 | | Noon | | PM 6:00 | |
| AM 12:15 | | AM 6:15 | | PM 12:15 | | PM 6:15 | |
| AM 12:30 | | AM 6:30 | | PM 12:30 | | PM 6:30 | |
| AM 12:45 | | AM 6:45 | | PM 12:45 | | PM 6:45 | |
| AM 1:00 | | AM 7:00 | | PM 1:00 | | PM 7:00 | |
| AM 1:15 | | AM 7:15 | | PM 1:15 | | PM 7:15 | |
| AM 1:30 | | AM 7:30 | | PM 1:30 | | PM 7:30 | |
| AM 1:45 | | AM 7:45 | | PM 1:45 | | PM 7:45 | |
| AM 2:00 | | AM 8:00 | | PM 2:00 | | PM 8:00 | |
| AM 2:15 | | AM 8:15 | | PM 2:15 | | PM 8:15 | |
| AM 2:30 | | AM 8:30 | | PM 2:30 | | PM 8:30 | |
| AM 2:45 | | AM 8:45 | | PM 2:45 | | PM 8:45 | |
| AM 3:00 | | AM 9:00 | | PM 3:00 | | PM 9:00 | |
| AM 3:15 | | AM 9:15 | | PM 3:15 | | PM 9:15 | |
| AM 3:30 | | AM 9:30 | | PM 3:30 | | PM 9:30 | |
| AM 3:45 | | AM 9:45 | | PM 3:45 | | PM 9:45 | |
| AM 4:00 | | AM 10:00 | | PM 4:00 | | PM 10:00 | |
| AM 4:15 | | AM 10:15 | | PM 4:15 | | PM 10:15 | |
| AM 4:30 | | AM 10:30 | | PM 4:30 | | PM 10:30 | |
| AM 4:45 | | AM 10:45 | | PM 4:45 | | PM 10:45 | |
| AM 5:00 | | AM 11:00 | | PM 5:00 | | PM 11:00 | |
| AM 5:15 | | AM 11:15 | | PM 5:15 | | PM 11:15 | |
| AM 5:30 | | AM 11:30 | | PM 5:30 | | PM 11:30 | |
| AM 5:45 | | AM 11:45 | | PM 5:45 | | PM 11:45 | |

## ACTIVITY CODES:

PATIENT CARE
1. Office exams and treatments
2. Telephone calls
3. Home, industry, or school visits
4. OPD or clinic exams and treatments
5. Dialysis unit - outpatient
6. Dialysis unit - inpatient
7. Emergency room
8. Hospital - on wards or floors (incl. daily rounds)
9. Hospital - in surgery
10. Hospital - OB delivery
11. Extended care facility (Nursing home)
12. Teaching rounds

OTHER PROFESSIONAL
13. Consultations
14. Supervision of personnel
15. Laboratory and other indirect care
16. Patient education
17. Teaching - other
18. Teaching related: Meetings, specific document research, materials
19. Research
20. Research related: Meetings, fiscal, personnel, specific document analysis
21. Continuing education: National/regional meetings, courses, self-instruction, professional journals
22. Health-related committee activities, including patient record review

ADMINISTRATION
23. Patient related: Charts, billing, insurance forms, lab reports, pharmacy, medical/legal
24. Other: Dictating, salesman, purchasing, personnel and management

PROFESSIONAL TRAVEL
25. Travel: Enroute to hospital, office, meetings, etc.

OTHER
26. On call (use only if you are on call and one of the other codes in this list is not applicable)
27. Completion of this survey instrument
28. Civic activities, service clubs
29. Personal - not on call

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# PART II, SECTION B: PATIENT ENCOUNTERS - TELEPHONE

**INSTRUCTIONS** Record all telephone calls during which you speak directly to a patient or a member of his/her family regarding clinical and/or counselling services. DO SO ONLY FOR THE THREE DETAILED RECORDING DAYS INDICATED ON THE FRONT COVER. Do not select other days to record telephone calls. Use one line per telephone encounter. Try to record the pertinent information as soon as possible after each telephone call. Start a new page at the beginning of each of the three recording days.

Do not record consultation calls with other health professionals, pharmacy calls, personal calls, or calls in which a patient merely schedules an appointment. Do not record calls handled totally by other staff. For example, a receptionist may be handling a call but seeks your advice and then returns to the phone. You would not record this call.

*Please familiarize yourself with the following category descriptions, the example page, and the Coding Key before you begin recording in this section.*

## PATIENT ID AND LINE NUMBER

- Patient ID – This perforated column is provided for your convenience so that you can identify each patient and his/her encounter (e.g., by initials, names, office number, etc.). Tear off this perforated column when it is no longer needed.
- Line Number – This number is used for keypunching purposes only.

## ENCOUNTER DATE AND TIME

- Encounter Date – Record the date at the top of the column. Use as many pages as necessary for each day. Begin each day's recording at the top of a new page. If you do not have any telephone encounters on a particular day, simply enter the date in the space provided and write "NONE" across the page.
- Time – Record the exact amount of time (in minutes) which you spend with each patient on the telephone.

## PATIENT CHARACTERISTICS

- Age – A reasonable estimate of the patient's age will be sufficient for study purposes. If age is less than one year, enter "0".
- Sex – Use numeric code only.
- Regular Patient? – Record "1" (Yes) if you regularly see the patient for any problem and feel that you have established an ongoing medical relationship with the patient.

## PATIENT'S PROBLEM

A patient may have one or more problems. In the case of more than one problem, please record information on the primary problem only. A primary problem is here defined as the one which, in your judgment, is the most important in this encounter.

- New Problem to You? – Record "1" (Yes) if the primary problem you are considering in this encounter is being presented to you for the first time by this patient. Record "2" (No) if this is a follow-up encounter.
- Renal Dialysis Status – Select and record the ONE numerical code from the list immediately above the chart that describes the patient's renal disease status. Record "1" (None) if the patient is not currently receiving any form of renal dialysis treatment, "2" if the patient is being dialyzed for acute renal failure, and one of codes 3–8 to indicate the type and location of dialysis for patients with end-stage renal disease: hemodialysis (either "center," "facility," or "home"), CAPD (continuous ambulatory peritoneal dialysis), IPD (intermittent peritoneal dialysis) or CCPD (continuous cycling peritoneal dialysis).
- Focus – From the Coding Key to the right of the chart, select and record the ONE numerical code for that system or part of the body involved in the patient's primary problem.

## ACTIONS REGARDING TELEPHONE CALL (CHECK ALL THAT APPLY)

- Drugs – Record a checkmark (✓) in the box under "Refill" or "Order" or both to indicate the action(s) you took as a result of this telephone call. If you took neither of these actions, leave the boxes blank.
- Tests – Record a checkmark (✓) in the box under "Give results" or "Order" or both to indicate the action(s) you took during or as a result of this telephone call. If you took neither of these actions, leave the boxes blank.
- Other – Record a checkmark (✓) in the box under "Status report" or "Advice/Directions" or "Counseling" or any combination of these to indicate the action(s) you took during this telephone call. If you took none of these actions, leave the boxes blank.

## URGENCY OF PROBLEM

- Select and record the ONE numerical code from the Coding Key to the right of the chart which best describes how soon you needed to talk with the patient about his/her primary problem. Record "1" (None) in cases where there is no disease, injury or surgery involved (e.g., patient education).

## YOUR NEXT CONTACT

- Indicate whether and under what circumstances you expect to see or talk to the patient again for his/her primary problem. Choose the ONE most appropriate numerical code from the Coding Key to the right of the chart. For example, record "4" (Visit scheduled) if the patient is to come in to see you or someone else in your practice. Record "1" (None this problem) if you do not expect further contact with a patient for his/her primary problem.

## REFERRAL

- Record "1" (Yes) if you referred the patient to another health professional or agency. Record "2" (No) if no referral was made.

**PLEASE REVIEW INSTRUCTIONS BEFORE STARTING**

| RENAL DIALYSIS STATUS | | END-STAGE RENAL DISEASE (CODES 3–8) |
|---|---|---|
| | 1. None<br>2. Acute renal failure | 3. Hospital-based center hemodialysis<br>4. Freestanding facility hemodialysis<br>5. Home hemodialysis<br>6. CAPD<br>7. IPD<br>8. CCPD |

Tear off here

| PATIENT ID<br>Your Use Only | Line Number | ENCOUNTER DATE AND TIME<br>9/20/82<br>Mo. Day Yr.<br>Date<br>Time in Minutes | PATIENT CHARACTERISTICS<br>Age<br>Estimate to nearest year "0" = under one year | Sex<br>1. Male 2. Female | Regular patient? 1. Yes 2. No | New problem to you? 1. Yes 2. No | Renal Dialysis Status | PATIENT'S PROBLEM<br>Focus<br>(Use Coding Key to the right) | ACTIONS RE: TELEPHONE CALL (CHECK ALL THAT APPLY)<br>Drugs<br>Refill | Order | Tests<br>Give results | Order | Other<br>Status report | Advice/Directions | Counseling | Urgency of problem (Use Coding Key to the right) | Your next contact (Use Coding Key to the right) | Referral? 1. Yes 2. No |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AA | 101 | 5 | 34 | 1 | 1 | 2 | 4 | 13 | | ✓ | | | ✓ | ✓ | | 3 | 10 | 2 |
| BB | 102 | 7 | 10 | 2 | 2 | 1 | 1 | 24 | | | | | | ✓ | | 3 | 4 | 2 |
| CC | 103 | 4 | 56 | 2 | 1 | 2 | 1 | 28 | | ✓ | ✓ | | | | ✓ | 1 | 4 | 2 |
| | | | | | | | | | | | | | | | | | | |

Patients' problems illustrated above were:

AA - Patient called to report dizziness after hemodialysis.

BB - Patient's mother called to discuss symptoms of possible kidney infection.

CC - Patient called to obtain test results.

## CODING KEY

**FOCUS OF PATIENT'S PROBLEM**

1. Well patient
2. Skin, incl. nails, hair
3. Head/Neck
4. Eyes
5. Ears/Nose/Mouth/Throat
6. Breasts
7. Respiratory
8. Access device-circulatory
9. Access device-peritoneal
10. Circulatory-heart
11. Circulatory-other
12. Blood/Lymphatics
13. Body fluids
14. Electrolytes
15. Acid base
16. Liver/Gallbladder
17. Gastrointestinal-other
18. Musculoskeletal
19. Endocrine
20. Neurological
21. Emotional

RENAL

22. Vascular
23. Glomerular
24. Tubules/Interstitium
25. Functional disorder of Kidney
26. Renal - other

URINARY TRACT

27. Ureter
28. Bladder
29. Lower urinary tract
30. Urinary tract-other
31. Reproductive system
32. Multi-system*

*Use only if one of the above is not more descriptive and correct.

**URGENCY OF PROBLEM**

1. None
2. Could have deferred call
3. Needed to call today
4. Should have called sooner
5. Emergency

**YOUR NEXT CONTACT**

1. None this problem
2. Telephone

OUTPATIENT

3. Return as necessary
4. Visit scheduled
5. House call

INPATIENT

6. At hospital admission
7. On rounds (prior admission)
8. In surgery
9. ICU/Recovery room

OTHER

10. Dialysis unit
11. Emergency room
12. Extended care facility (Nursing home)
13. Other

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**PART II, SECTION B: PATIENT ENCOUNTERS—TELEPHONE**

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# PART II, SECTION B: PATIENT ENCOUNTERS—TELEPHONE

PLEASE REVIEW INSTRUCTIONS BEFORE STARTING

**RENAL DIALYSIS STATUS**

1. None
2. Acute renal failure

END-STAGE RENAL DISEASE (CODES 3–8)

3. Hospital-based center hemodialysis
4. Freestanding facility hemodialysis
5. Home hemodialysis
6. CAPD
7. IPD
8. CCPD

Tear off here

| PATIENT ID<br>Your Use Only | Line Number | ENCOUNTER DATE AND TIME<br>Mo. Day Yr.<br>Date<br>Time In Minutes | PATIENT CHARACTERISTICS<br>Age<br>Estimate to nearest year "0" = under one year | Sex<br>1. Male 2. Female | Regular patient?<br>1. Yes 2. No | New problem to you?<br>1. Yes 2. No | Renal Dialysis Status | PATIENT'S PROBLEM<br>Focus<br>(Use Coding Key to the right) | ACTIONS RE: TELEPHONE CALL (CHECK ALL THAT APPLY)<br>Drugs<br>Refill | Order | Tests<br>Give results | Order | Other<br>Status report | Advice/Directions | Counseling | Urgency of problem<br>(Use Coding Key to the right) | Your next contact<br>(Use Coding Key to the right) | Referral?<br>1. Yes 2. No |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | |
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## CODING KEY

**FOCUS OF PATIENT'S PROBLEM**

1. Well patient
2. Skin, incl. nails, hair
3. Head/Neck
4. Eyes
5. Ears/Nose/Mouth/Throat
6. Breasts
7. Respiratory
8. Access device-circulatory
9. Access device-peritoneal
10. Circulatory-heart
11. Circulatory-other
12. Blood/Lymphatics
13. Body fluids
14. Electrolytes
15. Acid-base
16. Liver/Gallbladder
17. Gastrointestinal-other
18. Musculoskeletal
19. Endocrine
20. Neurological
21. Emotional

RENAL

22. Vascular
23. Glomerular
24. Tubules/Interstitium
25. Functional disorder of Kidney
26. Renal - other

URINARY TRACT

27. Ureter
28. Bladder
29. Lower urinary tract
30. Urinary tract-other
31. Reproductive system
32. Multi-system*

*Use only if one of the above is not more descriptive and correct.

**URGENCY OF PROBLEM**

1. None
2. Could have deferred call
3. Needed to call today
4. Should have called sooner
5. Emergency

**YOUR NEXT CONTACT**

1. None this problem
2. Telephone

OUTPATIENT

3. Return as necessary
4. Visit scheduled
5. House call

INPATIENT

6. At hospital admission
7. On rounds (prior admission)
8. In surgery
9. ICU/Recovery room

OTHER

10. Dialysis unit
11. Emergency room
12. Extended care facility (Nursing home)
13. Other

# PART II, SECTION C: PATIENT ENCOUNTERS - OUTPATIENT/INPATIENT

**INSTRUCTIONS** Describe each encounter in which you provide clinical and/or counseling services to a patient. Record the pertinent encounter information for each patient on the two horizontal lines provided. Try to record the information as soon as possible after each encounter. COMPLETE A LINE FOR EVERY PATIENT SEEN DURING THE THREE DETAILED RECORDING DAYS INDICATED ON THE FRONT COVER. Do not select other days to record information about patient encounters. Be sure to begin a new page for each of the three Detailed Recording Days.

*Please familiarize yourself with the following category descriptions, the example page, and the Coding Key before you begin recording in this section.*

PATIENT ID AND LINE NUMBER

- Patient ID – This perforated column is provided for your convenience so that you can identify each patient and his/her encounter (e.g., by initials, names, office number, etc.). This identification will make it possible for your staff to record the information regarding Patient and Encounter Characteristics. Tear off this perforated column when it is no longer needed.

- Line Number – This number is used for keypunching purposes only.

ENCOUNTER DATE AND TIME

- Encounter Date – Record the date at the top of the column. Use as many pages as necessary for each day. Begin each day's recording at the top of a new page. If you do not have any patient encounters on a particular day, simply enter the date in the space provided and write "NONE" across the page.

- Time – Record the exact amount of time (in minutes) which you spend with each patient in a direct, face-to-face encounter.

PATIENT AND ENCOUNTER CHARACTERISTICS

- Encounter Location – From the list of possible encounter locations at the top of the page, select and record the ONE code number which best describes where the patient was seen.

- Age – A reasonable estimate of the patient's age will be sufficient for study purposes. If age is less than one year, enter "0".

- Sex – Use numeric code only.

- Race/Ethnicity – From the list of Racial/Ethnic categories at the top of the page, select and record the ONE code number that best describes the patient. If the patient's racial or ethnic background is unknown or ambiguous, code the most likely category based on his or her physical appearance.

- Seen Patient Before? – Record "1" (Yes) if you have given some prior professional service to the patient for any problem.

- Regular Patient? – Record "1" (Yes) if you regularly see the patient for any problem and feel that you have established an ongoing medical relationship with the patient.

- Patient Source – This refers to how you initially obtained the patient for the problem which prompted this visit. For example, even though you may have seen the patient several times for this problem, if you obtained him/her as a referral from another practice or agency, you should classify the encounter as a referral. Select ONE code only.

  *Self/Patient:* Record "1" if (a) the contact was patient-initiated without physician, or agency intervention; or (b) the patient is part of your regular non-referral/non-consultation practice.

  *Agency:* Record "2" if the patient was referred to you by a medical society, voluntary health organization, welfare department, etc.

  *Physician:* Record "3" if the patient was referred to you by another physician/surgeon.

  *Consult:* Record "4" if the patient was sent to you by another provider to obtain your opinion or advice (e.g., to confirm an earlier diagnosis); or if the role you have is one of an assistant in providing care.

  NOTE: Ongoing responsibility for the patient resides with you after an actual referral has been made (i.e., codes 1-3), but this is not the case when the patient is referred to you for consultation.

- Provide Majority of This Patient's Care? – Record "1" (Yes) if this is a patient who normally comes to you for the majority of his/her health problems whether they are diagnosed, treated, or triaged by you. This does not include patients seen only on a consulting basis. Record "3" (Undetermined) if this information is unknown at this time.

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- **Your Role** – If you are the principal provider of care for this problem, record "1" (Provide). If you are in a supportive role for another health professional or act as a consultant, record "2" (Assist).

  NOTE: Assist refers to your role vis-a-vis another health professional, not your role vis-a-vis the patient.

## PATIENT'S PROBLEM(S)

A patient may have one or more problems. The recording form is designed to reflect this fact. A primary problem is here defined as the one which, in your judgment, is the most important in this encounter. Where chronic renal disease is involved—particularly if it is end-stage—then an underlying etiology (or etiologies) led to the end-stage renal failure. Information regarding the "history" of the disease is asked for under RENAL DISEASE STATUS. Information concerning the diagnoses considered at this time is obtained through your listing of diagnostic and therapeutic procedures, the classification of the encounter, the status upon completion of this visit, and in your written primary and related diagnoses. *Please be sure to complete all sections of this portion of the form; none are repetitive and all are critical in understanding the profile of diseases seen within your practice.*

- **Number of visits for primary problem in last 6 months** – Record the number of visits you have had with the patient during the last 6 months for his or her primary problem. Record "1" if this is the initial visit, "2" if this is the second visit, etc. It is not necessary to review your records for this information; your best estimate will suffice.

- **Renal Disease Status**

  *Renal disease etiology* – From the categories of renal disease listed on the Coding Key, select and record the ONE best descriptor of the etiology or general diagnosis for patients with renal disease—whether acute, chronic or chronic end-stage. Record "1" (None) if the patient has no renal disease, and record "15" (Other or unknown etiology) if the patient's disease etiology cannot be described by one of the categories provided.

  *Renal Dialysis* – From the Coding Key on the facing page, select and record the ONE numerical code that best describes the patient's renal dialysis status. Record "1" (None) if the patient is not currently receiving any form of renal dialysis treatment, "2" if the patient is being dialyzed for acute renal failure, and one of codes 3–8 to indicate the type and location of dialysis for patients with end-stage renal disease: hemodialysis (either "center," "facility," or "home"), CAPD (continuous ambulatory peritoneal dialysis), IPD (intermittent peritoneal dialysis) or CCPD (continuous cycling peritoneal dialysis).

## DIAGNOSTIC PROCEDURES

Common types of diagnostic procedures are listed in the Coding Key. Record the numeric codes indicated on the Coding Key for ALL tests you ordered, performed, or interpreted during this encounter for ALL the patient's problems. Record "1" (None) if no diagnostic procedures are used, and record "48" (Tests - other) if the tests ordered, performed, or interpreted are not described by one of the classes of tests listed. *Do not use any code to record a history or physical examination - these are considered to be standard procedures done for every patient.*

## THERAPEUTIC PROCEDURES

Common types of therapeutic procedures are listed in the Coding Key. Record the numeric codes indicated in the Coding Key for ALL procedures you ordered or performed during this encounter for ALL the patient's problems. Record "1" (None) if no therapeutic procedures are used, and record "33" (Rx–other) if the procedures ordered or performed are not described by one of the types of procedures listed.

## ENCOUNTER CLASSIFICATION

- **Complexity of Service** – The relative difficulty in determining appropriate therapy, in performing and/or interpreting diagnostic tests, in providing therapy, and in communicating with patients regarding their problem(s) are assessed as measures of complexity of service. The scale for complexity runs from the most simple (Minimal) through the most complex (Comprehensive). The complexity categories are frequently used in billing and are adapted from the AMA's Current Procedural Terminology (1970) and the California Relative Value Studies (1974).

In the complexity column, record the extent of ALL services rendered during each encounter. Please indicate the complexity level of each encounter using one of the following five categories:

(ENCOUNTER CLASSIFICATION – continued on next page)

(ENCOUNTER CLASSIFICATION – continued)

*Minimal:* Record "1" if the encounter involves minimal medical or surgical procedures such as blood pressure checks, checks of vascular access, etc.

*Brief:* Record "2" if the encounter involves simple follow-ups or check-ups, checking blood chemistries, reviewing medications, etc.

*Limited:* Record "3" if the encounter is an examination which includes a brief or interval history of the problem, a limited examination of an anatomical system or organ, and/or a discussion of findings with Dx and Rx performed as appropriate. This category may also include examination of heart lungs, insertion of urinary catheters, etc.

*Extended:* Record "4" if the encounter consists of an examination, Dx and Rx as in "3" but involves several anatomical systems and organs with diagnosis and/or treatment demanding an unusual amount of time and skill. This service does not require a complete examination of the patient. This category may also include therapeutic listening, dietary counseling, family counseling, etc.

*Comprehensive:* Record "5" if the encounter involves an extensive examination, Dx, Rx, and evaluation. The complexity of the diagnostic skill or therapy may be similar to "4" but also involves a total assessment of the patient. This category may also include complete work-ups of uremic patients, insertion of access devices (peritoneal or vascular), instituting dialytic therapy, pre-and post-transplant care, etc.

- Severity of Problem – Seven levels of problem severity are listed in the Coding Key. Select and record the ONE which best describes the severity of the patient's primary problem. (It is recognized that related problems may influence this rating.) Record "1" (None) in cases where there is no disease, injury, or surgery involved (e.g., patient education or well-patient visit).

- Urgency of Problem – Determine in your own judgment how soon you needed to see the patient for his/her primary problem, then select and record the ONE most appropriate category from the Coding Key. (It is recognized that related problems may influence this rating.) Record "1" (None) in cases where there is no disease, injury, or surgery involved (e.g., patient education or well-patient visit).

STATUS/DISPOSITION

- Your Next Contact – Indicate whether, and under what circumstances, you expect to see or talk to the patient again for his/her primary problem. Select and record the ONE most appropriate numerical code from the Coding Key. For example, record "4" (Visit scheduled) if the patient was scheduled to return to see you or someone else in your practice. Record "1" (None this problem) if you do not expect further contact with a patient for his/her primary problem.

- Referral/Consultation – Indicate the ONE provider or agency to whom the patient is being referred for his/her primary problem. For example, record "6" (Surgical specialist for care) if you refer the patient to an orthopedist for treatment. If no referral or request for consultation is made, record "1" (None).

PRIMARY Dx

For each patient, print your diagnosis of his/her primary problem in the space provided. If a final diagnosis is not appropriate, a working or tentative diagnosis will be sufficient. If even a tentative diagnosis is not appropriate, a brief description of the patient's problem, in terms of presenting signs or symptons, will suffice.

OTHER DX

For each of the patient's "Other" problems which you recorded on this chart, print your diagnosis(es) in the space provided.

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## RENAL DISEASE STATUS

### RENAL DISEASE ETIOLOGY

1. None

2. Primary hypertensive disease (Nephrosclerosis, benign or malignant)
3. Glomerulonephritis
4. Diabetic nephropathy
5. Polycystic kidney disease

6. Collagen vascular disease
7. Hereditary interstitial nephritis
8. Analgesic abuse nephropathy
9. Other interstitial nephritis (including pyelonephritis)

10. Obstructive uropathy, acquired
11. Obstructive uropathy, congenital
12. Amyloidosis
13. Multiple myeloma
14. Gouty nephropathy

15. Other or unknown etiology

### RENAL DIALYSIS

1. None
2. Acute renal failure

### END STAGE RENAL DISEASE

3. Hospital - based center hemodialysis
4. Freestanding facility hemodialysis
5. Home hemodialysis
6. CAPD
7. IPD
8. CCPD

## DIAGNOSTIC PROCEDURES

1. None

2. Doctor examination of urine
3. Routine lab: CBC, urinalysis
4. Immunologic test
5. Serology/VD
6. Blood Chemistry
7. "Panel" - automated (e.g.,SMA-12)
8. Arterial puncture
9. Hormonal assays

10. ECG
11. Culture
12. Enzymes

13. Biopsy - renal
14. Biopsy - other
15. Bone marrow

16. Cystoscopy
17. Endoscopy - other

### RADIOLOGY

18. Chest
19. Radioisotopic imaging
20. Intravenous urography
21. Retrograde urography
22. Cystogram
23. Arteriography/Venography
24. Bone survey
25. GI
26. Cat scan
27. Radiology - other

### OTHER

28. Audiometry
29. EEG
30. Ultrasound
31. Renal vein catheterization
32. Catheterization - other
33. Needle aspiration
34. Nerve conduction/EMG

35. Glucose tolerance
36. Lipid screen
37. Liver function
38. Lumbar puncture
39. Pulmonary function
40. Thyroid function

41. Creatinine clearance
42. Quantitative urine protein
43. Renal concentration test
44. Renal function - other

45. Breast exam
46. Pap smear
47. Skin test

48. Tests - other

## THERAPEUTIC PROCEDURES

1. None

2. Immunizations
3. Injections - other

### SURGICAL

4. Access device surgery
5. Shunt declotting
6. Tubing change
7. Renal transplantation

8. Minor tissue removal
9. Incision/Drainage
10. Suturing only
11. Debridement
12. Foreign body removal
13. Dilatation/Curettage
14. Mechanical relief of urinary obstruction

15. Arthrocentesis
16. Paracentesis

17. Cauterization/Cryotherapy
18. Dressing: Apply/Remove
19. Suture removal
20. Surgery - other

### CATHETERIZATION

21. Urinary
22. Vascular, for dialysis access
23. Vascular, non-nephrologic
24. Peritoneal

### OTHER RX

25. Anesthetization
26. Steroids/Immunosuppressive therapy
27. Chemotherapy
28. Contraceptives, incl. IUD
29. Physical rehabilitation
30. Radiation therapy
31. Transfusion
32. Intravenous fluids

33. Rx - other

### COUNSELING

34. Family/Social/Sexual
35. Patient dialysis training
36. Patient education - other
37. Therapeutic listening/reassurance
38. Psychotherapy

### PRESCRIPTIONS/ORDERS

39. Drugs - systemic
40. Drugs - topical
41. Exercise/Activity
42. Diet
43. Prosthesis/Aids

## ENCOUNTER CLASSIFICATION

### COMPLEXITY OF SERVICE

1. Minimal
2. Brief
3. Limited
4. Extended
5. Comprehensive

### SEVERITY OF PROBLEM

1. None
2. Minor - acute
3. Minor - chronic
4. Moderate - acute
5. Moderate - chronic
6. Severe - acute
7. Severe - chronic

### URGENCY OF PROBLEM

1. None
2. Could have been deferred
3. Needed to see today
4. Should have seen sooner
5. Emergency

## STATUS/DISPOSITION

### YOUR NEXT CONTACT

1. None this problem
2. Telephone

OUTPATIENT

3. Return as necessary
4. Visit scheduled
5. House call

INPATIENT

6. At hospital admission
7. On rounds (prior admission)
8. In surgery
9. ICU/Recovery room

### OTHER

10. Dialysis unit
11. Emergency room
12. Extended care facility (Nursing home)
13. DOA/Death
14. Other

### REFERRAL/CONSULTATION

1. None
2. Return to referral source
3. Medical specialist for care
4. Medical specialist for consult
5. Surgical specialist for care
6. Surgical specialist for consult
7. Dentist
8. Physician extender (e.g., Medex, Nurse practitioner, Physician's assistant)
9. Therapist/Technician (e.g., dietary)
10. Public agency/Social Worker
11. Other

# CODING KEY

**ENCOUNTER LOCATION**

1. Office
2. OPD/Clinic
3. Outpatient Dialysis Unit
4. Inpatient Dialysis Unit
5. Hospital – Other
6. Emergency Room
7. Extended Care (Nursing Home)
8. Home
9. Other

PLEASE REVIEW INSTRUCTIONS BEFORE STARTING

**PATIENT'S RACE OR ETHNICITY**

1. White (non-Hispanic)
2. Black (non-Hispanic)
3. Hispanic
4. Asian or Pacific Islander
5. American Indian or Alaskan native

Tear off here

PATIENT ID

Your Use Only

Line Number

Staff may complete this section

**ENCOUNTER DATE and TIME**

/ /
Mo. Day Yr.
Date

Time in Minutes

**PATIENT & ENCOUNTER CHARACTERISTICS**

Location (use one of the above codes 1-9)

Age: Estimate to nearest year "0" = under one year

Sex: 1. Male 2. Female

Race/Ethnicity (use one of above codes 1-5)

Seen patient before? 1. Yes 2. No

Regular patient? 1. Yes 2. No

Patient Source: 1. Self/Patient 2. Agency 3. Physician 4. Consult

Provide majority of this patient's care? 1. Yes 2. No 3. Undetermined

Your role? 1. Provide 2. Assist

Number of visits for primary problem in last 6 months

PATIENT'S PROBLEM(S) Usé numbers from Coding Key

**RENAL DISEASE STATUS**

Renal disease etiology

Renal Dialysis

**DIAGNOSTIC PROCEDURES**

Record all procedures you ordered, performed or interpreted during this encounter.

If None record "1".

**THERAPEUTIC PROCEDURES**

Record all procedures you ordered or performed during this encounter.

If None record "1".

**ENCOUNTER CLASS**

Complexity of service

Severity of problem

Urgency of problem

**STATUS**

Your next contact

Referral/Consultation

| | |
|---|---|
| Primary Dx (Print) | Other Dx (Print) |
| Primary Dx (Print) | Other Dx (Print) |
| Primary Dx (Print) | Other Dx (Print) |
| Primary Dx (Print) | Other Dx (Print) |
| Primary Dx (Print) | Other Dx (Print) |

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## PART II, SECTION C: PATIENT ENCOUNTERS—OUTPATIENT/INPATIENT

# COMPARISON OF TWO DAYS OF DATA

## COMPARISONS OF TWO DAYS OF DATA

The USC log-diary survey instrument assigns each respondent three "detailed recording days" within the study week to record patient encounter data. Half of the respondents are assigned to Monday through Wednesday, the other half to Thursday through Saturday. The resulting data are subsequently combined to describe the entire week (excluding Sunday) for the specialty as a whole.

These data have the patient encounter (rather than the patient per se) as the "unit of analysis;" patients seen more than once during the three-day period (e.g., hospitalized patients) will be represented in multiple patient encounter records. Since the every-other-day pattern of hemodialysis treatments presented the possibility of large numbers of multiple entries for physicians who made dialysis rounds more than once in a three-day period, the investigators sought to assess the possible impact of this effect on patient encounter data by comparing the data with the first two days of patient encounters provided by each physician.

The results of this procedure are shown in Tables 93-95, wherein two versus three days of data are compared for patients with ESRD. Perhaps the most important of these three tables is Table 93, which shows that the three days of data utilized throughout this report do not bias the resulting statistics in favor of patients on facility hemodialysis vis-a-vis those on home hemodialysis or peritoneal dialysis. As shown in the table, the representation of hospital-based center hemodialysis patients falls less than one percentage point, and the representation of freestanding facility hemodialysis patients actually increases less

TABLE 93. COMPARISON OF TWO VERSUS THREE DAYS OF OUTPATIENT/INPATIENT ENCOUNTER DATA FOR PATIENTS WITH END-STAGE RENAL DISEASE: TYPE OF RENAL DIALYSIS

| Category Label | Two Days of Data N | Two Days of Data % | Three Days of Data N | Three Days of Data % |
|---|---|---|---|---|
| Hospital-based center hemodialysis | 1909 | 38.8 | 2530 | 39.5 |
| Freestanding facility hemodialysis | 2523 | 51.2 | 3229 | 50.4 |
| Home hemodialysis | 95 | 1.9 | 118 | 1.8 |
| CAPD | 235 | 4.8 | 312 | 4.9 |
| IPD/CCPD | 164 | 3.3 | 222 | 3.4 |
| Total | 4,926 | 100.0 | 6,411 | 100.0 |

than one percentage point when the data from each physician's third recording day are dropped. Tables 94 and 95 corroborate this findin by showing that there are no biases caused in two pivotal variables-diagnostic tests and complexity of service--through the use of three days of data.

TABLE 94. COMPARISON OF TWO VERSUS THREE DAYS OF OUTPATIENT/INPATIENT ENCOUNTER DATA FOR PATIENTS WITH END-STAGE RENAL DISEASE: DIAGNOSTIC TESTS

| Category Label | Two Days of Data | | Three Days of Data | |
|---|---|---|---|---|
| | N | % | N | % |
| None | 2555 | 56.1 | 3384 | 56.8 |
| Doctor examination of urine | 29 | 0.6 | 38 | 0.6 |
| Routine lab: CBC, urinalysis | 994 | 21.8 | 1290 | 21.7 |
| Immunologic test | 76 | 1.7 | 91 | 1.5 |
| Serology/VD | 14 | 0.3 | 21 | 0.4 |
| Blood chemistry | 1094 | 24.0 | 1407 | 23.6 |
| "Panel" - automated (e.g., SMA-12) | 696 | 15.3 | 876 | 14.7 |
| Arterial puncture | 54 | 1.2 | 76 | 1.3 |
| Hormonal assays | 21 | 0.5 | 25 | 0.4 |
| ECG | 199 | 4.4 | 263 | 4.4 |
| Culture | 164 | 3.6 | 218 | 3.7 |
| Enzyme | 44 | 1.0 | 55 | 0.9 |
| Biopsy - renal | 2 | 0.0 | 2 | 0.0 |
| Biopsy - other | 4 | 0.1 | 4 | 0.1 |
| Bone marrow | 1 | 0.0 | 4 | 0.1 |
| Cystoscopy | 3 | 0.1 | 4 | 0.1 |
| Endoscopy - other | 9 | 0.2 | 11 | 0.2 |
| RADIOLOGY | | | | |
| Chest | 273 | 6.0 | 351 | 5.9 |
| Radioisotopic imaging | 11 | 0.2 | 17 | 0.3 |
| Intravenous urography | 0 | 0.0 | 0 | 0.0 |
| Retrograde urography | 1 | 0.0 | 1 | 0.0 |
| Cystogram | 15 | 0.3 | 16 | 0.3 |
| Arteriography/Venography | 16 | 0.4 | 21 | 0.4 |
| Bone survey | 25 | 0.5 | 27 | 0.5 |
| GI | 35 | 0.8 | 44 | 0.7 |
| Cat scan | 23 | 0.5 | 32 | 0.5 |
| Radiology - other | 86 | 1.9 | 103 | 1.7 |
| OTHER | | | | |
| Audiometry | 4 | 0.1 | 5 | 0.1 |
| EEG | 11 | 0.2 | 13 | 0.2 |
| Ultrasound | 30 | 0.7 | 39 | 0.7 |

TABLE 94. (CONTINUED)

| Category Label | Two Days of Data N | Two Days of Data % | Three Days of Data N | Three Days of Data % |
|---|---|---|---|---|
| Renal vein catheterization | 5 | 0.1 | 5 | 0.1 |
| Catheterization - other | 8 | 0.2 | 9 | 0.2 |
| Needle aspiration | 4 | 0.1 | 5 | 0.1 |
| Nerve conduction/EMG | 11 | 0.2 | 11 | 0.2 |
| Glucose tolerance | 0 | 0.0 | 1 | 0.0 |
| Lipid screen | 6 | 0.1 | 6 | 0.1 |
| Liver function | 32 | 0.7 | 34 | 0.6 |
| Lumbar puncture | 4 | 0.1 | 4 | 0.1 |
| Pulmonary function | 17 | 0.4 | 19 | 0.3 |
| Thyroid function | 9 | 0.2 | 10 | 0.2 |
| Creatinine clearance | 15 | 0.3 | 16 | 0.3 |
| Quantitative urine protein | 5 | 0.1 | 6 | 0.1 |
| Renal concentration test | 0 | 0.0 | 0 | 0.0 |
| Renal function - other | 15 | 0.3 | 15 | 0.3 |
| Breast exam | 2 | 0.0 | 4 | 0.1 |
| Pap smear | 1 | 0.0 | 3 | 0.1 |
| Skin test | 4 | 0.1 | 5 | 0.1 |
| Tests - other | 138 | 3.0 | 173 | 2.9 |
| Total | 6,765 | 148.4 | 8,764 | 147.6 |

TABLE 95. COMPARISON OF TWO VERSUS THREE DAYS OF OUTPATIENT/INPATIENT ENCOUNTER DATA FOR PATIENTS WITH END-STAGE RENAL DISEASE: COMPLEXITY OF SERVICE

| Category Label | Two Days of Data | | Three Days of Data | |
|---|---|---|---|---|
| | N | % | N | % |
| Minimal | 1295 | 26.8 | 1730 | 27.5 |
| Brief | 1555 | 32.1 | 1938 | 30.8 |
| Limited | 1294 | 26.7 | 1682 | 26.7 |
| Extended | 539 | 11.1 | 729 | 11.6 |
| Comprehensive | 157 | 3.2 | 218 | 3.5 |
| Total | 4,840 | 100.0 | 6,297 | 100.0 |

# CODING OF COMPLEXITY OF SERVICE

## CODING OF COMPLEXITY OF SERVICE

The complexity of service constitutes a unique variable on the patient encounter recording form. It is a well-defined variable, incorporating familiar categories, yet it is also a "subjective" variable that (like severity and urgency) is subject to interpretation on the part of the physician. In the instructions for the patient encounter recording form, the variable is explained as follows:

- Complexity of Service – The relative difficulty in determining appropriate therapy, in performing and/or interpreting diagnostic tests, in providing therapy, and in communicating with patients regarding their problem(s) are assessed as measures of complexity of service. The scale for complexity runs from the most simple (Minimal) through the most complex (Comprehensive). The complexity categories are frequently used in billing and are adapted from the AMA's Current Procedural Terminology (1970) and the California Relative Value Studies (1974).

In the complexity column, record the extent of ALL services rendered during each encounter. Please indicate the complexity level of each encounter using one of the following five categories:

*Minimal:* Record "1" if the encounter involves minimal medical or surgical procedures such as blood pressure checks, checks of vascular access, etc.

*Brief:* Record "2" if the encounter involves simple follow-ups or check-ups, checking blood chemistries, reviewing medications, etc.

*Limited:* Record "3" if the encounter is an examination which includes a brief or interval history of the problem, a limited examination of an anatomical system or organ, and/or a discussion of findings with Dx and Rx performed as appropriate. This category may also include examination of heart-lungs, insertion of urinary catheters, etc.

*Extended:* Record "4" if the encounter consists of an examination, Dx and Rx as in "3" but involves several anatomical systems and organs with diagnosis and/or treatment demanding an unusual amount of time and skill. This service does not require a complete examination of the patient. This category may also include therapeutic listening, dietary counseling, family counseling, etc.

*Comprehensive:* Record "5" if the encounter involves an extensive examination, Dx, Rx, and evaluation. The complexity of the diagnostic skill or therapy may be similar to "4" but also involves a total assessment of the patient. This category may also include complete work-ups of uremic patients, insertion of access devices (peritoneal or vascular), instituting dialytic therapy, pre-and post-transplant care, etc.

As the complexity of service constitutes an important analytical variable in this report (serving as a dependent variable in a regression equation), we sought to determine whether it is an unbiased measure of the scope of services provided by renal physicians. This was addressed by means of two study questions (1) are there any differences in the coding of complexity for Medicare patients versus others? And (2) is there a "response-set" in the coding of complexity by various physicians?

Table 96 presents the results of the first of these questions. In the table, a Medicare-eligible patient is one who is either (1) an ESRD patient, (2) 65 years or older, or (3) both. All others are classified as non-Medicare patients. As the table shows, there is no tendency for physicians to note greater complexity of services for Medicare patients; in fact, there is a statistically significant tendency to note less complexity for Medicare patients. A rigorous answer to the question would, of course, require controls for patient/encounter variables (e.g., ambulatory vs. non-ambulatory care) but the preliminary indication, at least, is that there is no overall bias towards noting greater complexity for Medicare patients.

Table 97 addresses the second question by listing the mean complexity of service scores noted for ESRD patients by all physicians who had at least 10 encounters with such patients. (Each mean is the average for an individual physician.) Although there are many possible explanations for within-physician homogeneity and between-physician hetergeneity on complexity of service (e.g., that some physicians devote a good deal of time to dialysis rounds whereas others have greater numbers of office visits), the table does support the idea of a tendency for physicians to note

TABLE 96. COMPLEXITY OF SERVICE FOR NON-MEDICARE VERSUS MEDICARE-ELIGIBLE PATIENTS[1]

| Complexity of Service | Non-Medicare Patients % | Medicare Eligible Patients % | Total % |
|---|---|---|---|
| Minimal | 5.4 | 22.4 | 17.9 |
| Brief | 19.7 | 27.6 | 25.5 |
| Limited | 42.8 | 31.2 | 34.2 |
| Extended | 19.7 | 13.6 | 15.2 |
| Comprehensive | 12.5 | 5.3 | 7.2 |
| Total | 100.0 | 100.0 | 100.0 |

*Statistical Significance* = ***

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[1] Medicare-eligible is defined as consisting of ESRD patients plus Non-ESRD patients 65 years or over. Statistical significance determined by means of the chi-square test; *** = $\leq$ .001.

TABLE 97. DISTRIBUTION OF MEAN COMPLEXITY OF SERVICE SCORES BY RESPONDING PHYSICIAN*

| Mean | Standard Deviation | N |
|---|---|---|
| 1.0000 | 0.0 | 19 |
| 1.0294 | 0.1702 | 68 |
| 1.0377 | 0.2360 | 106 |
| 1.0833 | 0.2803 | 36 |
| 1.1014 | 0.4584 | 69 |
| 1.1053 | 0.3110 | 38 |
| 1.1316 | 0.4425 | 76 |
| 1.1605 | 0.6216 | 81 |
| 1.2353 | 0.7808 | 34 |
| 1.2632 | 0.8601 | 38 |
| 1.2778 | 0.5745 | 18 |
| 1.3200 | 0.8025 | 100 |
| 1.3226 | 0.5993 | 31 |
| 1.3500 | 0.6998 | 40 |
| 1.3500 | 0.7452 | 20 |
| 1.3846 | 0.6504 | 13 |
| 1.4000 | 0.7539 | 20 |
| 1.4250 | 0.7472 | 40 |
| 1.4512 | 0.8628 | 82 |
| 1.4595 | 0.7301 | 37 |
| 1.4615 | 0.7606 | 26 |
| 1.5000 | 0.9661 | 16 |
| 1.5455 | 0.8152 | 88 |
| 1.5588 | 1.2108 | 34 |
| 1.5625 | 0.6812 | 48 |
| 1.5833 | 0.9373 | 36 |
| 1.6154 | 1.1688 | 26 |
| 1.6232 | 0.8762 | 69 |
| 1.6250 | 0.9574 | 16 |
| 1.6364 | 1.0269 | 11 |
| 1.7000 | 0.4830 | 10 |
| 1.7000 | 1.5120 | 30 |
| 1.7273 | 0.9898 | 55 |
| 1.7500 | 0.8563 | 16 |
| 1.7536 | 0.9611 | 69 |
| 1.7895 | 0.9177 | 19 |
| 1.8000 | 0.8982 | 60 |
| 1.8116 | 1.1411 | 69 |
| 1.8235 | 0.3930 | 17 |
| 1.8438 | 1.1670 | 32 |
| 1.8696 | 0.3444 | 23 |
| 1.8816 | 0.9376 | 76 |
| 1.8846 | 0.8779 | 52 |
| 1.8889 | 0.9791 | 36 |
| 1.9259 | 0.7808 | 27 |
| 1.9552 | 0.6613 | 67 |
| 1.9589 | 1.0333 | 73 |
| 2.0000 | 0.0 | 36 |
| 2.0000 | 0.0 | 18 |
| 2.0000 | 0.6325 | 11 |
| 2.0000 | 0.0 | 10 |
| 2.0364 | 0.9993 | 55 |
| 2.0476 | 1.0690 | 63 |
| 2.0625 | 0.2500 | 16 |
| 2.0625 | 0.2500 | 16 |
| 2.0714 | 0.2623 | 28 |
| 2.0741 | 1.0066 | 54 |
| 2.0769 | 0.8393 | 39 |
| 2.0833 | 0.5836 | 24 |
| 2.0926 | 0.8303 | 54 |
| 2.1000 | 0.4026 | 30 |
| 2.1000 | 1.2867 | 10 |
| 2.1053 | 0.4506 | 57 |
| 2.1111 | 0.3234 | 18 |
| 2.1250 | 0.3416 | 16 |
| 2.1277 | 0.4942 | 47 |
| 2.1333 | 0.9904 | 15 |
| 2.1333 | 0.3519 | 15 |
| 2.1622 | 0.4973 | 74 |
| 2.1818 | 1.1847 | 33 |
| 2.1842 | 0.7299 | 38 |
| 2.1875 | 1.2764 | 16 |
| 2.2000 | 0.5774 | 25 |
| 2.2069 | 0.6199 | 29 |
| 2.2069 | 0.6144 | 58 |
| 2.2093 | 0.6746 | 43 |
| 2.2143 | 1.0509 | 14 |
| 2.2400 | 0.8794 | 25 |
| 2.2558 | 0.4415 | 43 |
| 2.2778 | 0.8264 | 18 |
| 2.2800 | 1.3077 | 25 |
| 2.2813 | 0.6539 | 64 |
| 2.3061 | 0.5847 | 49 |
| 2.3077 | 0.9473 | 13 |
| 2.3148 | 1.1463 | 54 |
| 2.3214 | 0.5480 | 28 |

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* Includes physicians who recorded complexity of service scores for at least 10 patients.

TABLE 97. (CONTINUED)

| Mean | Standard Deviation | N |
|---|---|---|
| 2.3333 | 0.9847 | 12 |
| 2.3478 | 0.7141 | 23 |
| 2.3521 | 0.6782 | 71 |
| 2.3529 | 0.8689 | 85 |
| 2.3571 | 0.6333 | 14 |
| 2.3636 | 0.7424 | 33 |
| 2.3750 | 0.7009 | 72 |
| 2.3750 | 0.7188 | 16 |
| 2.3774 | 0.7132 | 53 |
| 2.3793 | 0.9788 | 29 |
| 2.4000 | 1.4041 | 15 |
| 2.4000 | 0.5026 | 20 |
| 2.4286 | 1.1923 | 42 |
| 2.4483 | 0.9097 | 29 |
| 2.4545 | 1.2933 | 11 |
| 2.5000 | 0.9045 | 12 |
| 2.5294 | 1.5858 | 17 |
| 2.5532 | 0.8549 | 47 |
| 2.5577 | 0.7775 | 52 |
| 2.5833 | 0.7173 | 24 |
| 2.5926 | 0.7971 | 27 |
| 2.6000 | 0.5154 | 10 |
| 2.6486 | 0.9194 | 37 |
| 2.6875 | 1.2500 | 16 |
| 2.6923 | 0.7511 | 13 |
| 2.7059 | 0.4625 | 34 |
| 2.7308 | 0.6602 | 52 |
| 2.7647 | 1.3477 | 17 |
| 2.7692 | 0.8321 | 13 |
| 2.7692 | 0.9268 | 13 |
| 2.7692 | 0.6823 | 78 |
| 2.8261 | 1.3048 | 46 |
| 2.8400 | 0.7384 | 50 |
| 2.8571 | 0.5732 | 21 |
| 2.8667 | 0.9732 | 30 |
| 2.8750 | 0.5696 | 48 |
| 2.8889 | 0.8318 | 45 |
| 2.8923 | 0.3590 | 65 |
| 2.9394 | 0.9334 | 33 |
| 2.9524 | 1.7169 | 21 |
| 2.9535 | 0.9989 | 43 |
| 2.9545 | 1.0901 | 22 |
| 3.0000 | 0.0 | 41 |
| 3.0000 | 0.0 | 20 |
| 3.0000 | 1.1180 | 17 |
| 3.0000 | 0.5164 | 16 |
| 3.0164 | 0.9745 | 61 |
| 3.0476 | 0.2182 | 21 |
| 3.0508 | 0.2891 | 59 |
| 3.0556 | 0.9241 | 36 |
| 3.0656 | 1.0144 | 61 |
| 3.0714 | 1.7744 | 14 |
| 3.0714 | 1.0157 | 28 |
| 3.0741 | 0.3849 | 27 |
| 3.0769 | 0.7596 | 13 |
| 3.0769 | 0.6234 | 39 |
| 3.1053 | 0.8753 | 19 |
| 3.1053 | 1.2425 | 19 |
| 3.1176 | 1.0537 | 17 |
| 3.1250 | 0.5000 | 16 |
| 3.1429 | 0.3563 | 28 |
| 3.2222 | 0.6468 | 18 |
| 3.2414 | 0.8724 | 29 |
| 3.2917 | 0.7506 | 24 |
| 3.3125 | 0.6021 | 16 |
| 3.3158 | 0.9848 | 57 |
| 3.3208 | 0.7538 | 53 |
| 3.3333 | 0.7112 | 30 |
| 3.3529 | 1.0572 | 17 |
| 3.3529 | 1.0572 | 17 |
| 3.4000 | 0.5071 | 15 |
| 3.4211 | 0.9016 | 19 |
| 3.4722 | 0.9996 | 36 |
| 3.5227 | 0.7921 | 44 |
| 3.6316 | 0.4956 | 19 |
| 3.7059 | 0.8714 | 34 |
| 3.7619 | 0.4293 | 63 |
| 3.8125 | 1.1087 | 16 |
| 3.8438 | 1.0506 | 32 |
| 3.9231 | 0.7596 | 13 |
| 4.0000 | 0.0 | 34 |
| 4.0833 | 1.1645 | 12 |
| 4.2105 | 0.7873 | 19 |
| 4.3077 | 0.9473 | 13 |

similar levels of complexity for all of their ESRD patients. Evidence for this can be found at both extremes of the distribution, where it is clear that some physicians are recording a "1" or a "4" for almost every patient seen. Means in the middle of the distribution are not similarly interpretable (except for those with extremely low standard deviations) but it is clear that the subjective aspect of complexity of service may lead to the formation of a "response-set" in certain physicians in which they tend to record similar levels of complexity of service for most or all of their patients.

# PATIENT RACE, DIALYSIS TYPE AND RENAL DISEASE ETIOLOGY

## PATIENT RACE, DIALYSIS TYPE AND RENAL DISEASE ETIOLOGY

As noted in the body of this report, the substantial differences in both renal disease etiology (Table 66) and race/ethnicity (Table 72) by dialysis type prompted a supplemental analysis of etiology differences controlling for race. This is based on longstanding epidemiological findings showing a higher incidence of hypertension among black populations in the United States. It would also have been interesting to examine American Indians and Hispanics, since both American Indians and Latin Americans living in the Southwest have been shown to have significantly higher rates of diabetes mellitus, but the case-bases (n's) for these groups are insufficient to support the partitioning of etiology data by the six types of dialysis shown in Tables 66 through 80.

Thus, Tables 98 and 99 show the distributions of renal disease etiology by race (white versus black) for each type of hemodialysis (Table 98) and peritoneal dialysis (Table 99). As discussed in the text (above), the tables show differences in hypertension between hospital-based hemodialysis centers and freestanding facilities, both as a function of race and independent of the racial composition of the patient populations. As shown in Table 98, blacks have more than twice the rates of hypertension compared to whites in both locations: 39.7% compared to 18.7% in hospital-based centers, and 48.5% compared to 21.8% in freestanding facilities. At the same time, the rate for whites is 17% higher, and that for blacks 22% higher, in freestanding

TABLE 98. DISTRIBUTION OF RENAL DISEASE ETIOLOGY BY TYPE OF HEMODIALYSIS AND RACE OF NON-HISPANIC WHITES AND BLACKS (ESRD PATIENTS)[1]

| | TYPE OF HEMODIALYSIS | | | | | |
|---|---|---|---|---|---|---|
| | HOSPITAL-BASED CENTER | | FREESTANDING FACILITY | | HOME | |
| Renal Disease Etiology | WHITE (N=1565) | BLACK (N=725) | WHITE (N=1487) | BLACK (N=1172) | WHITE (N=94) | BLACK (N=18)[2] |
| | % | % | % | % | % | % |
| Primary hypertensive disease (Nephrosclerosis, benign or malignant) | 18.7 | 39.7 | 21.8 | 48.5 | 16.0 | 44.4 |
| Glomerulonephritis | 26.1 | 20.0 | 26.6 | 16.3 | 31.9 | 44.4 |
| Diabetic nephropathy | 16.2 | 18.8 | 14.1 | 17.6 | 8.5 | 11.1 |
| Polycystic kidney disease | 9.2 | 2.6 | 7.9 | 2.7 | 18.1 | 0.0 |
| Collagen vascular disease | 2.7 | 2.8 | 3.2 | 2.4 | 7.4 | 0.0 |
| Hereditary interstitial nephritis | 0.7 | 0.8 | 1.3 | 0.4 | 3.2 | 0.0 |
| Analgesic abuse nephropathy | 1.5 | 0.4 | 2.6 | 0.9 | 0.0 | 0.0 |
| Other interstitial nephritis (Including pyelonephritis) | 6.8 | 3.7 | 7.2 | 3.2 | 7.4 | 0.0 |
| Obstructive uropathy, acquired | 4.0 | 1.0 | 2.4 | 0.9 | 0.0 | 0.0 |
| Obstructive uropathy, congenital | 1.5 | 0.3 | 1.4 | 0.3 | 1.1 | 0.0 |
| Amyloidosis | 0.6 | 0.1 | 0.3 | 0.0 | 1.1 | 0.0 |
| Multiple myeloma | 0.8 | 0.8 | 0.8 | 0.3 | 0.0 | 0.0 |
| Gouty nephropathy | 0.8 | 0.1 | 0.4 | 0.3 | 0.0 | 0.0 |
| Other or unknown etiology | 10.5 | 8.8 | 10.1 | 6.1 | 5.3 | 0.0 |
| TOTAL | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

[1] Numbers of ESRD patients in other ethnic groups are insufficient to support disaggregated frequency distributions shown here. There were 499 encounters with ESRD patients who are Hispanic, 131 with Asian or Pacific Islanders, and 32 with American Indians or Alaskan natives.

[2] Individual percentages in distributions with small numbers of encounters may be unreliable and should be interpreted with caution.

TABLE 99. DISTRIBUTION OF RENAL DISEASE ETIOLOGY BY TYPE OF PERITONEAL DIALYSIS AND RACE OF NON-HISPANIC WHITES AND BLACKS (ESRD PATIENTS)[1]

| | TYPE OF PERITONEAL DIALYSIS | | | | | |
|---|---|---|---|---|---|---|
| | CAPD | | IPD | | CCPD[2] | |
| Renal Disease Etiology | WHITE (N=233) % | BLACK (N=60) % | WHITE (N=87) % | BLACK (N=78) % | WHITE (N=37) % | BLACK (N=7) % |
| Primary hypertensive disease (Nephrosclerosis, benign or malignant) | 13.7 | 41.7 | 29.9 | 42.3 | 2.7 | -- |
| Glomerulonephritis | 21.9 | 16.7 | 4.6 | 9.0 | 32.4 | -- |
| Diabetic nephropathy | 31.8 | 25.0 | 21.8 | 34.6 | 45.9 | -- |
| Polycystic kidney disease | 14.2 | 1.7 | 10.3 | 2.6 | 5.4 | -- |
| Collagen vascular disease | 0.4 | 1.7 | 1.1 | 1.3 | 2.7 | -- |
| Hereditary interstitial nephritis | 1.3 | 0.0 | 0.0 | 0.0 | 0.0 | -- |
| Analgesic abuse nephropathy | 0.4 | 0.0 | 1.1 | 0.0 | 0.0 | -- |
| Other interstitial nephritis (Including pyelonephritis) | 6.0 | 1.7 | 8.0 | 1.3 | 5.4 | -- |
| Obstructive uropathy, acquired | 0.0 | 0.0 | 4.6 | 0.0 | 0.0 | -- |
| Obstructive uropathy, congenital | 0.4 | 1.7 | 2.3 | 0.0 | 0.0 | -- |
| Amyloidosis | 1.7 | 0.0 | 0.0 | 0.0 | 0.0 | -- |
| Multiple myeloma | 3.4 | 0.0 | 0.0 | 0.0 | 0.0 | -- |
| Gouty nephropathy | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -- |
| Other or unknown etiology | 4.7 | 10.0 | 16.1 | 9.0 | 5.4 | -- |
| TOTAL | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | -- |

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[1] Numbers of ESRD patients in other ethnic groups are insufficient to support disaggregated frequency distributions shown here. There were 499 encounters with ESRD patients who are Hispanic, 131 with Asian or Pacific Islanders, and 32 with American Indians or Alaskan natives.

[2] Individual percentages in distributions with small numbers of encounters may be unreliable and should be interpreted with caution.

facilities, indicating that there is a difference (albeit much less pronounced) independent of race. Also notable in Tables 98 and 99 are the substantially higher rates of polycystic kidney disease and other interstitial nephritis for whites versus blacks (for all dialysis types) and the higher rates of amyloidosis for whites on hospital-based center hemodialysis and peritoneal dialysis.

# DERIVATION OF WEIGHTED DIAGNOSTIC TESTS AND THERAPEUTIC PROCEDURES

## DERIVATION OF WEIGHTED DIAGNOSTIC TESTS AND THERAPEUTIC PROCEDURES

The weighting of diagnostic tests and therapeutic procedures (to facilitate the entry of these categories as dependent variables in multivariate regression equations) was undertaken for the purpose of analyzing the complexity of care provided to patients of various subspecialists in internal medicine, using USC's national data-base on physician care.* Since nephrology is one of the subspecialties for which tests and procedures were assigned weights, the resulting data were utilized in the analysis of care provided for ESRD patients, even though (1) there were no nephrologists on the rating panel, and (2) raters were not told that the weights applied to patients with ESRD; in fact, the ratings were specifically intended to be independent of the patient's diagnosis.

The panel of physician consultants used to rate the tests and procedures consisted of 6 pulmonary disease specialists, 3 gastroenterologists, 2 endocrinologists, 3 general internists, 3 cardiologists, and 3 family practitioners. In a modified delphi technique, panelists were given packets of rating forms to complete independently, then were brought together into 6 separate specialty groups to arrive at consensus ratings of complexity of care from the perspective of their respective specialties. Finally, the study staff compiled the ratings elicited from the various sub-panels, deleting categories for which there was a marked absence of inter-specialty consensus from the analysis.

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*Results of the analysis are reported in: Mendenhall, R.C., Moynihan, C.J., and Radecki, S.E. "The relative complexity of primary care provided by medical specialists," Medical Care, 1984. (In Press)

The instructions provided to the panelists, along with the ratings for the diagnostic tests and therapeutic procedures utilized in the present study, are shown in Tables 100 and 101. Since multiple diagnostic tests and therapeutic procedures could be recorded for a given patient encounter, the complexity score for that encounter was a function both of the number of procedures employed and of the valences associated with those procedures.

A comparison of the weighted sums of diagnostic tests and therapeutic procedures utilized in the regressions reported in Tables 81 and 84-87 with the numbers of tests and procedures utilized in Tables 61, 63 and 64 is shown in Table 102. The table compares the two types of scores by both dialysis type and encounter location, with data deleted for "cells" that have an inadequate case-base. As shown in the table, the general pattern evident for both indices is similar; none of the differences found in the unweighted counts are reversed as a result of the weighting process. Rather, the use of weighted sums merely constitutes a slight refinement to the simple counts of tests and procedures, capable of reflecting the relative complexity of the individual categories as well as the number of categories noted on the recording form.

TABLE 100. INTERNISTS' RATINGS OF DIAGNOSTIC TESTS*

INSTRUCTIONS:

Please assign a score of from 1 (least complex) to 5 (most complex) to each of the diagnostic tests listed below, based on the probable complexity involved in the use of the test from the physician's point of view. For the purposes of this classification, the least complex tests (score 1) are tests which are ordered with high frequency, which are relatively less expensive, which have the lowest rates of morbidity, and which can be simply performed. The most complex tests (score 5) are those which are performed infrequently, which are expensive, which carry significant risk in their performance, which create a greater degree of patient discomfort, which require a physician to perform them, which may require a higher degree of technology, and which may require either hospitalization or intensive observation. Tests which fall between these two extremes should be assigned intermediate scores of from 2 to 4.

| DIAGNOSTIC TEST | SCORE |
|---|---|
| 1. None | 0 |
| 2. Doctor examination of urine | 2 |
| 3. Routine lab: CBC, urinalysis | 1 |
| 4. Immunologic test | 2.5 |
| 5. Serology/VD | 1 |
| 6. Blood Chemistry | 1 |
| 7. "Panel" - automated (e.g., SMA-12) | 1 |
| 8. Arterial puncture | 3 |
| 9. Hormonal assays | 3 |
| 10. ECG | 2 |
| 11. Culture | 1 |
| 12. Enzymes | 1 |
| 13. Biopsy - renal | 4.5 |
| 14. Biopsy - other | 3 |
| 15. Bone marrow | 3 |
| 16. Cystoscopy | 3.5 |
| 17. Endoscopy - other | 3.5 |
| RADIOLOGY | |
| 18. Chest | 2 |
| 19. Radioisotopic imaging | 3 |
| 20. Intravenous urography | 3 |
| 21. Retrograde urography | 4 |
| 22. Cystogram | 3.5 |
| 23. Arteriography/Venography | 5 |
| 24. Bone survey | 2.5 |
| 25. GI | 3 |
| 26. Cat scan | 4 |
| 27. Radiology - other | 2 |

TABLE 100. (CONTINUED)

| OTHER | SCORE |
|---|---|
| 28. Audiometry | 2 |
| 29. EEG | 3 |
| 30. Ultrasound | 3 |
| 31. Renal vein catheterization | 4.5 |
| 32. Catheterization - other | 3.5 |
| 33. Needle aspiration | 3 |
| 34. Nerve conduction/EMG | 3 |
| 35. Glucose tolerance | 2 |
| 36. Lipid screen | 2 |
| 37. Liver function | 2 |
| 38. Lumbar puncture | 2.5 |
| 39. Pulmonary function | 2.5 |
| 40. Thyroid function | 2 |
| 41. Creatinine clearance | 2 |
| 42. Quantitative urine protein | 2 |
| 43. Renal concentration test | 2.5 |
| 44. Renal function - other | 2 |
| 45. Breast exam | 2 |
| 46. Pap smear | 1.5 |
| 47. Skin test | 2 |
| 48. Tests - other | 2.5 |

*Panelists' ratings of the complexity of care indicated by the use of certain procedures was independent of the patient's actual diagnosis; thus, ratings are not specific to ESRD or any other disease, and the scores may in fact differ if panelists applied the procedures to an ESRD patient population. The rating panel consisted of 6 pulmonary disease specialists, 3 gastroenterologists, 2 endocrinologists, 3 general internists, 3 cardiologists, and 3 family practitioners. Scores shown above represent consensus ratings derived from ratings supplied by panelists.

## TABLE 101. INTERNISTS' RATINGS OF THERAPEUTIC PROCEDURES*

INSTRUCTIONS:

Please assign a score of from 1 (least complex) to 5 (most complex) to each of the therapeutic procedures listed below, based on the probable complexity involved in the use of the procedure from the physician's point of view. For the purposes of this classification, the least complex therapies (score 1) are those which are routine, frequently employed, and involve the least risk to the patient. The most complex therapies (score 5) are those (such as surgical procedures to the chest or abdomen) which are radical and/or complex in nature, which indicate that the patient is seriously ill, and which may expose the patient to substantial risk. Procedures which fall between these two extremes should be assigned intermediate scores of from 2 to 4.

| THERAPEUTIC PROCEDURE | SCORE |
|---|---|
| 1. None | 0 |
| 2. Immunizations | 1 |
| 3. Injections - other | 2 |
| SURGICAL | |
| 4. Access device surgery | 4 |
| 5. Shunt declotting | 4 |
| 6. Tubing change | 3 |
| 7. Renal transplantation | 5 |
| 8. Minor tissue removal | 2.5 |
| 9. Incision/Drainage | 2 |
| 10. Suturing only | 2 |
| 11. Debridement | 2.5 |
| 12. Foreign body removal | 3 |
| 13. Dilatation/Curettage | 3 |
| 14. Mechanical relief of urinary obstruction | 3 |
| 15. Arthrocentesis | 3 |
| 16. Paracentesis | 2.5 |
| 17. Cauterization/Cryotherapy | 3 |
| 18. Dressing: Apply/Remove | 2 |
| 19. Suture removal | 1 |
| 20. Surgery - other | 4 |
| CATHETERIZATION | |
| 21. Urinary | 2 |
| 22. Vascular, for dialysis access | 3 |
| 23. Vascular, non-nephrologic | 3 |
| 24. Peritoneal | 3 |

TABLE 101. (CONTINUED)

| OTHER RX | SCORE |
|---|---|
| 25. Anesthetization | 4 |
| 26. Steroids/Immunosuppressive therapy | 3 |
| 27. Chemotherapy | 3.5 |
| 28. Contraceptives, incl. IUD | 2 |
| 29. Physical rehabilitation | 2.5 |
| 30. Radiation therapy | 4 |
| 31. Transfusion | 3 |
| 32. Intravenous fluids | 2 |
| 33. Rx - other | 2.5 |
| COUNSELING | |
| 34. Family/Social/Sexual | 3 |
| 35. Patient dialysis training | 2.5 |
| 36. Patient education - other | 2.5 |
| 37. Therapeutic listening/reassurance | 2.5 |
| 38. Psychotherapy | 3 |
| PRESCRIPTIONS/ORDERS | |
| 39. Drugs - systemic | 2 |
| 40. Drugs - topical | 1 |
| 41. Exercise/Activity | 1 |
| 42. Diet | 1.5 |
| 43. Prosthesis/Aids | 2 |

*Panelists' ratings of the complexity of care indicated by the use of certain procedures was independent of the patient's actual diagnosis; thus, ratings are not specific to ESRD or any other disease, and the scores may in fact differ if panelists applied the procedures to an ESRD patient population. The rating panel consisted of 6 pulmonary disease specialists, 3 gastroenterologists, 2 endocrinologists, 3 general internists, 3 cardiologists, and 3 family practitioners. Scores shown above represent consensus ratings derived from ratings supplied by panelists.

TABLE 102. COMPARISON OF WEIGHTED AND UNWEIGHTED SUMS OF DIAGNOSTIC TESTS AND THERAPEUTIC PROCEDURES BY DIALYSIS TYPE AND ENCOUNTER LOCATION. (WEIGHTED SUMS ARE IN REGULAR TYPE, UNWEIGHTED IN ITALICS).

| | HEMODIALYSIS | | | | | | PERITONEAL DIALYSIS | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Encounter Location | HOSPITAL-BASED CENTER (N=2530) | | FREE-STANDING FACILITY (N=3229) | | HOME (N=118) | | CAPD (N=312) | | IPD (N=174) | | CCPD (N=48) | |
| WEIGHTED SUM OF DIAGNOSTIC TESTS | 1.2 | *0.9* | 0.9 | *0.7* | 2.6 | *1.7* | 2.4 | *1.7* | 1.6 | *1.2* | 1.6 | *1.3* |
| Office/OPD/Clinic | 1.1 | *0.7* | 1.8 | *1.3* | 2.8 | *1.9* | 2.5 | *1.9* | --- | --- | --- | --- |
| Outpatient Dialysis | 0.8 | *0.6* | 0.6 | *0.5* | --- | --- | 1.5 | *1.2* | 0.3 | *0.2* | --- | --- |
| Inpatient Dialysis | 1.6 | *1.1* | 1.0 | *0.7* | --- | --- | --- | --- | 1.7 | *1.3* | --- | --- |
| Hospital Inpatient | 2.4 | *1.6* | 2.4 | *1.5* | 2.7 | *1.7* | 2.6 | *1.8* | 2.0 | *1.5* | 2.1 | *1.6* |
| WEIGHTED SUM OF THERAPEUTIC PROCEDURES | 2.4 | *1.1* | 1.8 | *0.8* | 4.0 | *1.8* | 3.8 | *1.7* | 2.9 | *1.3* | 2.1 | *0.9* |
| Office/OPD/Clinic | 2.6 | *1.2* | 2.9 | *1.4* | 4.2 | *1.9* | 4.5 | *2.0* | --- | --- | --- | --- |
| Outpatient Dialysis | 2.0 | *0.9* | 1.5 | *0.7* | --- | --- | 4.0 | *1.6* | 1.1 | *0.5* | --- | --- |
| Inpatient Dialysis | 3.1 | *1.4* | 1.8 | *0.8* | --- | --- | --- | --- | 4.0 | *1.7* | --- | --- |
| Hospital Inpatient | 3.2 | *1.4* | 3.0 | *1.3* | 4.0 | *2.1* | 3.4 | *1.6* | 3.3 | *1.5* | 3.0 | *0.9* |

# QUESTIONNAIRE

# PART III: QUESTIONNAIRE

This questionnaire is designed to obtain information regarding:

- your medical education and current specialties;
- your types of practice arrangements;
- your formal teaching arrangements;
- the locations where you see patients;
- source of payment for professional services;
- location of laboratory work;
- your staff time-load;
- activities performed by your staff;
- physician manpower;
- your responses to this booklet; and,
- any additional comments you may have.

In addition, space is provided for requesting a profile of your individual practice. This will be available after the data have been analyzed.

The format is basically a check-list. Where percentages are requested, your best estimate is all that is required. You do not have to research your patient records for the answers. For the majority of the questions, your staff can help.

PLEASE ANSWER ALL QUESTIONS THAT APPLY

## A. YOUR MEDICAL EDUCATION AND CURRENT SPECIALTIES

| | |
|---|---|
| ADL | Adolescent Medicine |
| AI | Allergy and Immunology |
| AM | Aerospace Medicine |
| A | Allergy |
| AN | Anesthesiology |
| BE | Broncho-Esophagology |
| BLB | Bloodbanking |
| CD | Cardiovascular Diseases |
| D | Dermatology |
| DMP | Dermatopathology |
| DIA | Diabetes |
| EM | Emergency Medicine |
| END | Endocrinology |
| FP | Family Practice |
| GE | Gastroenterology |
| GP | General Practice |
| GPM | General Preventive Medicine |
| GER | Geriatrics |
| GYN | Gynecology |
| HEM | Hematology |
| HYP | Hypnosis |
| IG | Immunology |
| ID | Infectious Diseases |
| IM | Internal Medicine |
| LAR | Laryngology |
| LM | Legal Medicine |
| MFS | Maxillofacial Surgery |
| ND | Neoplastic Diseases |
| NEP | Nephrology |
| N | Neurology |
| NPM | Neonatal-Perinatal Medicine |
| CHN | Neurology, Child |
| NA | Neuropathology |
| NM | Nuclear Medicine |
| NR | Nuclear Radiology |
| NTR | Nutrition |
| OBS | Obstetrics |
| OBG | Obstetrics and Gynecology |
| OM | Occupational Medicine |
| ON | Oncology |
| OPH | Ophthalmology |
| OT | Otology |
| OTO | Otorhinolaryngology |
| PTH | Pathology |
| CLP | Pathology, Clinical |
| FOP | Pathology, Forensic |
| PD | Pediatrics |
| PDA | Pediatrics, Allergy |
| PDC | Pediatrics, Cardiology |
| PDE | Pediatric Endocrinology |
| PHO | Pediatric Hematology-Oncology |
| PNP | Pediatric Nephrology |
| PA | Pharmacology, Clinical |
| PM | Physical Medicine and Rehabilitation |
| P | Psychiatry |
| CHP | Psychiatry, Child |
| PYA | Psychoanalysis |
| PYM | Psychosomatic Medicine |
| PH | Public Health |
| PUD | Pulmonary Diseases |
| R | Radiology |
| DR | Radiology, Diagnostic |
| PDR | Radiology, Pediatric |
| TR | Radiology, Therapeutic |
| RHU | Rheumatology |
| RHI | Rhinology |
| RIP | Radioisotopic Pathology |
| ABS | Surgery, Abdominal |
| CDS | Surgery, Cardiovascular |
| CRS | Surgery, Colon and Rectal |
| GS | Surgery, General |
| HS | Surgery, Hand |
| HNS | Surgery, Head and Neck |
| NS | Surgery, Neurological |
| ORS | Surgery, Orthopedic |
| PDS | Surgery, Pediatric |
| PS | Surgery, Plastic |
| TS | Surgery, Thoracic |
| TRS | Surgery, Traumatic |
| U | Surgery, Urological |

1. Year of birth 1941

*We need the most current information obtainable regarding your education and specialties. Refer to the list of medical and surgical specialties (see left) and select the code(s) which best describes your professional commitments. For example, if "Allergy" applies to you, record "A". If your specialty is not listed, print it in the space(s) provided for Specialty Code.*

2. Current Specialties

| Specialty | Specialty Code (use code at left) | Percent of Professional Time | Years of Practice in This Specialty |
|---|---|---|---|
| a. Primary | NEP | 80.9 % | 9.4 |
| b. Secondary | IM | 21.7 % | 10.3 |
| c. All other | ---- | ---- % | ---- |

100%

PLEASE BE SURE CATEGORIES ADD TO 100 PERCENT

3. Education/Training

a. I received my medical degree from

____________________
(name of medical school)

in 1966

b. *(In responding to this question, insert the appropriate specialty codes, shown on the left, in the boxes provided below. If none, leave the boxes blank.)*

(1) I am in residency training in:

| | | |
|---|---|---|
| IM | NEP | U |
| (6) | (6) | (1) |

(2) I have completed residency training requirements for certification in:

| | | |
|---|---|---|
| IM | NEP | PD |
| (181) | (151) | (5) |

(3) I am board (or sub-board) certified in:

| | | |
|---|---|---|
| IM | NEP | PD |
| (263) | (180) | (6) |

## B. TYPES OF PRACTICE ARRANGEMENTS

1. Several of the following employment arrangements may be involved in your practice. Please check the one which you consider is your principal practice arrangement, whether you are employed by or are a member of that arrangement. Also, estimate the percent of your practice time in each arrangement indicated.

| | Principal Arrangement (CHECK ONE ONLY) | Type of Employment Arrangement | Percentage Distribution of Principal Arrangement Checked on Left |
|---|---|---|---|
| a. | ☐ | ................Solo Practice.............................. | 18.3 % |
| b. | ☐ | ................Partnership............................ | 17.7 % |
| c. | ☐ | ................Single Specialty Group.................. | 22.6 % |
| d. | ☐ | ................Multiple Specialty Group.............. | 10.1 % |
| e. | ☐ | ................Academic Department.................. | 20.7 % |
| f. | ☐ | ................Hospital.............................. | 6.7 % |
| g. | ☐ | ................Clinic.................................. | 0.9 % |
| h. | ☐ | ................Government (non-hospital)............... | 0 % |
| i. | ☐ | ................Other: __________ (Specify) | 3.0 % |
| | | | 100% |

PLEASE BE SURE CATEGORIES ADD TO 100 PERCENT

2. Group and Partnership Arrangements Only: If you practice as part of a group or partnership arrangement, please indicate the number of full-time and part-time physicians in your PRIMARY partnership or group for each of the following specialties, *including yourself.*

| Type of Specialty | Number of Full-Time Physicians | Number of Part-Time Physicians |
|---|---|---|
| Nephrology | 3.5 | 0.3 |
| General Internal Medicine | 2.2 | 0.1 |
| Family Practice | 0.1 | 0.0 |
| General Practice | 0.0 | 0.0 |
| General Surgery | 0.3 | 0.0 |
| Obstetrics/Gynecology | 0.3 | 0.0 |
| Orthopedic Surgery | 0.3 | 0.0 |
| Pediatrics | 0.3 | 0.0 |
| Psychiatry | 0.1 | 0.0 |
| Radiology | 0.2 | 0.1 |
| Other medical specialties | 1.1 | 0.1 |
| Other surgical specialties | 0.4 | 0.0 |

3. Is your practice incorporated? CHECK ONE.

a. ☐ Yes 68.4%

b. ☐ No 31.6%

If Yes, please indicate the distribution of shares by CHECKING ALL THAT APPLY.

c. ☐ Other physicians 34.2%

d. ☐ Practice associated support staff 3.9%

e. ☐ Public 0.3%

f. ☐ None 17.3%

g. ☐ Other: 6.0% ______________ (Specify)

## C. FORMAL TEACHING ARRANGEMENTS

1. Do you have a faculty appointment at a medical school or affiliated institution which trains physicians or physician support personnel? CHECK ONE.

a. ☐ No 16.0%

b. ☐ Yes, salaried full-time 24.5%

c. ☐ Yes, salaried three-fourths-time 1.3%

d. ☐ Yes, salaried half-time 2.5%

e. ☐ Yes, salaried less than half-time 8.2%

f. ☐ Yes, voluntary 47.5%

2. Do you have formal teaching responsibilities at a non-affiliated institution which involves training physicians or physician support personnel? CHECK ONE.

a. ☐ No 59.4%

b. ☐ Yes, salaried full-time 1.0%

c. ☐ Yes, salaried three-fourths-time 0.0%

d. ☐ Yes, salaried half-time 0.3%

e. ☐ Yes, salaried less than half-time 4.8%

f. ☐ Yes, voluntary 34.5%

## D. LOCATIONS WHERE YOU SEE PATIENTS

*If you are a resident, or if you do not normally see patients, check the box to the right, skip Sections D through H, and continue recording in Section I,* PHYSICIAN MANPOWER. ☐ 1.8%

1. In how many hospitals do you admit patients? CHECK ONE.

a. ☐ None 0%

b. ☐ One hospital 36.9%

c. ☐ Two hospitals 24.2%

d. ☐ Three hospitals 20.7%

e. ☐ Four or more hospitals 18.2%

2. In how many dialysis facilities do you treat patients? CHECK ONE.

a. ☐ None 0.3%

b. ☐ One facility 36.9%

c. ☐ Two facilities 33.1%

d. ☐ Three facilities 15.6%

e. ☐ Four or more facilities 14.0%

3. What is the form of reimbursement for dialysis treatment in your most frequently-used dialysis facility? CHECK ONE.

a. ☐ Initial "fee for service" method 15.6%

b. ☐ Alternate "capitation" method 84.4%

4. What is the number of dialysis stations at your most frequently used facility? RECORD NUMBER OF STATIONS.

Number of Stations 17.9

5. Are you an owner (shareholder) or a participant in profit-sharing at your most frequently-used dialysis facility? CHECK ONE.

a. ☐ Yes 14.2%

b. ☐ No 85.8%

6. How many of your own patients are currently receiving the following types of dialysis treatment: facility hemodialysis, home hemodialysis, CAPD (continuous ambulatory peritoneal dialysis), IPD (intermittent peritoneal dialysis), CCPD (continuous cycling peritoneal dialysis). RECORD THE NUMBER OF PATIENTS FOR EACH DIALYSIS MODALITY; IF NONE, RECORD "O"

| | NUMBER OF PATIENTS * |
|---|---|
| Facility hemodialysis | 21.6 |
| Home hemodialysis | 2.3 |
| CAPD | 2.9 |
| IPD | 0.3 |
| CCPD | 0.3 |

* Solo physicians only

7. Location: Check the descriptor below which best indicates the location of the principal office where you see patients. CHECK ONE.

a. ☐ City (central business district) 29.7%

b. ☐ City (not central business district) 46.0%

c. ☐ Suburban Area 12.5%

d. ☐ Small City/Town (5,000 - 25,000) 8.3%

e. ☐ Rural Area (less than 5,000) 0%

f. ☐ Other: 3.5% (Specify)

## E. REIMBURSEMENT FOR PROFESSIONAL SERVICES

Source of Payment: For your total practice, what percent of your professional services are paid or accounted for by each of the sources listed below?

| Source | Percent |
|---|---|
| Patient self-pay | 8.8 % |
| Private insurance - a percentage | 17.6 % |
| Private insurance - prepaid | 3.4 % |
| Worker's Compensation | 0.3 % |
| Medicare | 48.7 % |
| Medicaid | 8.7 % |
| Federal insurance - prepaid | 0.5 % |
| Other government program | 1.5 % |
| No fee | 1.9 % |
| Charitable service | 2.8 % |
| Other: ______________ (Specify) | 5.8 % |
|  | 100% |

PLEASE BE SURE CATEGORIES ADD TO 100 PERCENT

## F. LOCATION OF LABORATORY WORK

Where do you have the following routine lab work done? CHECK ALL LOCATIONS THAT APPLY.

| Lab Procedure | Within Your Practice | Outside Your Practice | Both Within and Outside of Practice |
|---|---|---|---|
| Blood Count | 28.4% | 62.1% | 9.5% |
| Chest X-ray | 21.6% | 74.2% | 4.2% |
| ECG | 52.9% | 32.7% | 14.4% |
| Culture | 23.0% | 69.5% | 7.5% |
| Urinalysis | 64.3% | 19.8% | 15.9% |

AND HOURS WORKED

For each type of personnel employed at your principal office, indicate the number of individuals employed and the number of hours per week they spend at that location. For example, if your practice employs one Registered Nurse who works 40 hours per week and three Registered Nurses who work 20 hours per week, then to the right of "Registered Nurse" you would place a "1" in the column headed "35-40" and a "3" in the column headed "20–24". *Be sure to count yourself.* PLEASE CHECK THE COLUMN ON THE LEFT IF NO PERSONNEL OF A PARTICULAR TYPE ARE EMPLOYED.

MEAN NUMBERS OF PERSONNEL IN EACH CATEGORY

Percentage of practices that do not have a particular type of personnel

| Types of Personnel | Check (✓) If No Such Personnel | Number of Hours Per Week: Under 20 | 20 - 24 | 25 - 34 | 35 - 40 | Over 40 |
|---|---|---|---|---|---|---|
| Physician | ▨ | 0.1 | 0.1 | 0.1 | 0.1 | 2.4 |
| Registered Nurse - Dialysis Nurse | 47.1% | 0.1 | 0.2 | 0.1 | 2.8 | 0.5 |
| Registered Nurse - Other | 53.9% | 0.1 | 0.0 | 0.0 | 0.5 | 0.2 |
| Nurse Practitioner (formally trained) | 73.2% | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 |
| Social Worker - Renal | 52.9% | 0.0 | 0.1 | 0.0 | 0.3 | 0.1 |
| Social Worker - Other | 74.6% | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Dialysis Technician | 55.0% | 0.0 | 0.0 | 0.0 | 1.7 | 0.3 |
| LPN or LVN | 49.3% | 0.0 | 0.0 | 0.1 | 1.0 | 0.1 |
| Physician's Assistant/Medex (formally trained) including Transplant Coordinator | 64.3% | 0.1 | 0.0 | 0.0 | 0.1 | 0.1 |
| Secretary / Receptionist | 6.4% | 0.2 | 0.1 | 0.1 | 2.1 | 0.3 |
| Renal Dietician | 47.1% | 0.2 | 0.1 | 0.0 | 0.2 | 0.0 |
| Community Health Aide | 78.9% | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Assistant trained within your practice | 63.2% | 0.0 | 0.0 | 0.0 | 0.4 | 0.1 |

## H. ACTIVITIES AND PROCEDURES PERFORMED BY SELF AND STAFF

In your practice, who performs each of the procedures listed below? For each activity/procedure, CHECK AS MANY INDIVIDUALS AS APPROPRIATE.

| PROCEDURE OR ACTIVITY | INDIVIDUAL WHO PERFORMS THE ACTIVITY | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NOT NORMALLY DONE | SELF | OTHER PHYSICIAN | NURSE PRACTITIONER | PHYSICIAN'S ASSISTANT/ MEDEX (formally trained) | ASSISTANT TRAINED WITHIN YOUR PRACTICE | REGISTERED NURSE | SOCIAL WORKER | LAB OR X-RAY TECHNICIAN | DIALYSIS TECHNICIAN | LPN/LVN OR AIDE | SECRETARY/RECEPTIONIS | OTHER S |
| **1. Health history:** | | | | | | | | | | | | | |
| complete history | 0 | 96 | 43 | 3 | 3 | 2 | 3 | 1 | 0 | 0 | 1 | 0 | 0 |
| partial history | 3 | 88 | 37 | 6 | 4 | 3 | 18 | 7 | 0 | 3 | 5 | 3 | 0 |
| **2. Health exam:** | | | | | | | | | | | | | |
| complete physical exam | 0 | 96 | 42 | 3 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| partial physical exam | 2 | 93 | 39 | 5 | 4 | 3 | 11 | 0 | 0 | 1 | 3 | 0 | 0 |
| **3. Selected Dx test:** | | | | | | | | | | | | | |
| blood tests | 17 | 16 | 9 | 1 | 2 | 4 | 21 | 0 | 55 | 10 | 6 | 2 | 4 |
| X-rays | 31 | 5 | 6 | 0 | 0 | 0 | 2 | 0 | 59 | 0 | 1 | 5 | 4 |
| blood pressure | 1 | 77 | 36 | 9 | 6 | 13 | 48 | 0 | 7 | 23 | 25 | 1 | 2 |
| ECG | 5 | 25 | 12 | 2 | 5 | 15 | 29 | 0 | 36 | 7 | 11 | 1 | 6 |
| urinalysis | 3 | 74 | 30 | 1 | 2 | 4 | 6 | 0 | 42 | 0 | 2 | 0 | 1 |
| culture | 21 | 15 | 7 | 2 | 2 | 3 | 14 | 0 | 55 | 3 | 4 | 0 | 3 |
| renal biopsy | 6 | 84 | 41 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 1 |
| Pap smear | 16 | 61 | 35 | 1 | 0 | 0 | 2 | 0 | 6 | 0 | 0 | 0 | 4 |
| skin tests | 19 | 29 | 19 | 3 | 3 | 5 | 33 | 0 | 13 | 1 | 8 | 0 | 5 |
| nerve conduction | 46 | 2 | 30 | 0 | 0 | 1 | 0 | 0 | 14 | 0 | 0 | 0 | 11 |
| needle aspiration | 29 | 50 | 42 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 4 |
| arterial puncture | 23 | 53 | 36 | 1 | 1 | 2 | 6 | 0 | 14 | 2 | 1 | 0 | 3 |
| cystogram | 49 | 0 | 38 | 0 | 0 | 0 | 1 | 0 | 13 | 0 | 0 | 0 | 6 |
| **4. Counsel regarding:** | | | | | | | | | | | | | |
| family / social / sexual | 2 | 82 | 38 | 5 | 2 | 1 | 28 | 58 | 1 | 4 | 5 | 1 | 3 |
| growth / development | 22 | 62 | 30 | 3 | 1 | 1 | 19 | 30 | 0 | 2 | 4 | 0 | 6 |
| patient education | 0 | 86 | 39 | 9 | 5 | 5 | 55 | 42 | 1 | 12 | 14 | 1 | 12 |
| diet / health | 1 | 75 | 33 | 4 | 2 | 5 | 32 | 7 | 0 | 4 | 7 | 0 | 50 |
| contraceptives | 28 | 60 | 32 | 4 | 1 | 1 | 12 | 4 | 0 | 0 | 1 | 0 | 4 |
| **5. Medical / Surgical Rx:** | | | | | | | | | | | | | |
| injections | 4 | 36 | 19 | 8 | 5 | 10 | 64 | 0 | 1 | 3 | 16 | 1 | 1 |
| incision / drainage | 26 | 53 | 46 | 1 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 4 |
| minor tissue removal | 34 | 41 | 40 | 1 | 2 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 4 |
| debridement | 35 | 37 | 42 | 1 | 3 | 0 | 4 | 0 | 0 | 1 | 1 | 0 | 4 |
| change dressings | 13 | 50 | 34 | 6 | 5 | 6 | 60 | 0 | 1 | 5 | 19 | 0 | 2 |
| catheterization - urinary | 27 | 36 | 32 | 6 | 3 | 3 | 40 | 0 | 1 | 2 | 12 | 0 | 4 |
| catheterization - vascular | 26 | 50 | 48 | 3 | 1 | 1 | 12 | 0 | 0 | 4 | 4 | 0 | 3 |
| declotting | 21 | 55 | 50 | 3 | 1 | 1 | 19 | 0 | 0 | 5 | 2 | 0 | 3 |
| peritoneal dialysis | 5 | 80 | 39 | 3 | 2 | 2 | 33 | 0 | 1 | 13 | 8 | 0 | 0 |
| extracorporeal dialysis | 6 | 61 | 30 | 2 | 1 | 3 | 55 | 0 | 1 | 40 | 20 | 0 | 0 |
| prescribe medication | 1 | 98 | 46 | 2 | 1 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| **6. Patient scheduling** | 0 | 19 | 8 | 3 | 3 | 9 | 32 | 2 | 0 | 2 | 6 | 71 | 6 |
| **7. Billing and collections** | 0 | 4 | 2 | 0 | 1 | 6 | 2 | 0 | 0 | 0 | 1 | 60 | 49 |

## I. PHYSICIAN MANPOWER

Check the appropriate box below to indicate your opinion of the physician manpower distribution in your community. For each specialty, indicate whether you believe there is a shortage of specialists in the area, the number is about right, or whether there is an excess of such specialists. CHECK ONE COLUMN FOR EACH SPECIALTY LISTED.

| Type of Specialty | Shortage | About Right | Excess | No Opinion |
|---|---|---|---|---|
| Family Practice | 17.3% | 53.0% | 17.9% | 11.8% |
| Internal Medicine | 8.3 | 52.5 | 35.4 | 3.8 |
| Psychiatry | 24.8 | 41.4 | 17.8 | 15.9 |
| Cardiology | 3.5 | 38.2 | 53.5 | 4.8 |
| Nephrology | 3.5 | 60.0 | 34.6 | 1.9 |
| General Surgery | 3.5 | 30.7 | 60.4 | 5.4 |
| Vascular Surgery | 8.3 | 51.4 | 33.9 | 6.4 |
| Urological Surgery | 3.5 | 55.3 | 35.8 | 5.4 |

## J. YOUR RESPONSES TO THIS BOOKLET

1. With regard to Part I (Week's Practice Summary), were these seven days typical in terms of your normal patient load?

   a. ☐ Yes 47.8%

   b. ☐ No 52.2% If No, indicate below which days were not typical and how they were different.

   ________________________________________

   ________________________________________

2. With regard to Part II, Sections B and C (Patient Encounters - Telephone; Patient Encounters - Outpatient/Inpatient), were the patient problems encountered typical of your practice?

   Section B (Telephone)

   a. ☐ Yes 79.9%

   b. ☐ No 20.1% If No, how do they differ from typical problems encountered?

   ________________________________________

   ________________________________________

   Section C (Outpatient/Inpatient)

   a. ☐ Yes 78.3%

   b. ☐ No 21.7% If No, how do they differ from typical problems encountered?

   ________________________________________

   ________________________________________

## K. COMMENTS

1. You may use the space below to offer any comments regarding this booklet or the study in general.

48.8% OF RESPONDENTS ENTERED COMMENTS

2. Estimate the total number of hours you spent in completing this booklet.

3.5 hours
(MEDIAN)

3. When the data are analyzed would you like to receive an individual profile of your practice?

a. ☐ Yes 84.4%

b. ☐ No 15.6%

THANK YOU FOR COMPLETING THIS BOOKLET.
PLEASE RETURN IT IN THE POSTAGE – PAID
ENVELOPE PROVIDED.

# INDIVIDUAL PROFILE OF PRACTICE

# INDIVIDUAL PROFILE

PROFILE PREPARED FOR

FROM THE RENAL DISEASE PRACTICE STUDY CONDUCTED BY THE DIVISION OF RESEARCH IN MEDICAL EDUCATICN, UNIVERSITY OF SOUTHERN CALIFORNIA.

THIS PROFILE HAS BEEN PREPARED AT YCUR REQUEST FOR YOUR PERSONAL USE. THIS IS THE ONLY COPY OF THIS PROFILE, AND NO OTHER COPIES WILL BE PREPARED BY THE RESEARCHERS FOR ANY PURPOSE. ACCESS TO THE DATA FROM WHICH THIS PROFILE WAS GENERATED IS CONTROLLED, AND ANY RELEASE OF STUDY DATA TO QUALIFIED RESEARCHERS INCLUDES THE DELETICN OF NAMES, ADDRESSES, AND ALL OTHER IDENTIFYING INFORMATICN.

## DATA PROVIDED BY YOU

FOR EACH TABLE IN THE PROFILE, DATA PROVIDED BY YOU ARE SHOWN IN COLUMN (1). PAGES 4 THROUGH 9 ARE BASED ON 30 PATIENT ENCOUNTERS REPORTED BY YOU.

## DATA FOR ALL PHYSICIANS STUDIED

COMPARATIVE DATA IN COLUMN (2) REPRESENT THE 336 PHYSICIANS IN THE STUDY.

## AVERAGE WEEKLY WORKLOAD DATA

## (DERIVED FROM PART I OF THE SURVEY INSTRUMENT)

| | (1) YOUR PRACTICE | (2) AVERAGE FOR ALL PHYSICIANS STUDIED |
|---|---|---|
| NO. OF OUTPATIENT VISITS | 33 | 65 |
| NO. OF INPATIENT VISITS | 38 | 47 |
| TOTAL PATIENT VISITS | 71 | 112 |
| NO. OF TELEPHONE ENCOUNTERS | 8 | 17 |
| NO. OF PROFESSIONAL HOURS | 65 | 55 |

THE TABLE BELOW PRESENTS THE RAW DATA YOU SUPPLIED IN THE SURVEY INSTRUMENT. THE SUMMARY DATA IN COLUMN (1) WERE DERIVED FROM THE RAW DATA.

| | DAY OF WEEK | | | | | | |
|---|---|---|---|---|---|---|---|
| | SU | MO | TU | WE | TH | FR | SA |
| NO. OF OUTPATIENT VISITS | 0 | 9 | 6 | 7 | 3 | 6 | 2 |
| NO. OF INPATIENT VISITS | 0 | 5 | 5 | 7 | 7 | 7 | 7 |
| NO. OF TELEPHONE ENCOUNTERS | 0 | 1 | 2 | 2 | 2 | 1 | 0 |
| NO. OF PROFESSIONAL HOURS | 0 | 12 | 12 | 12 | 12 | 12 | 5 |

## AVERAGE DAILY TIME UTILIZATION DATA (HOURS PER DAY)

## (DERIVED FROM PART II-A OF THE SURVEY INSTRUMENT)

| PROFESSIONAL ACTIVITY | (1) YOUR PRACTICE | (2) AVERAGE FOR ALL PHYSICIANS STUDIED |
|---|---|---|
| OFFICE EXAMS AND TREATMENTS | 0.2 | 1.1 |
| TELEPHONE CALLS | 0.2 | 0.4 |
| DIALYSIS UNIT | 0.2 | 1.2 |
| HOSPITAL PATIENT CARE | 1.0 | 1.9 |
| OTHER PATIENT CARE | 1.5 | 0.5 |
| TOTAL PATIENT CARE | 3.1 | 5.1 |
| OTHER PROFESSIONAL | | |
| TEACHING AND RESEARCH | 2.9 | 0.8 |
| OTHER | 0.0 | 1.3 |
| ADMINISTRATION | 0.3 | 0.7 |
| PROFESSIONAL TRAVEL | 2.3 | 1.0 |
| SUBTOTAL (PROFESSIONAL ACTIVITIES) | 8.7 | 8.9 |
| ON CALL | 14.8 | 4.1 |
| OTHER (PERSONAL) | 0.5 | 11.0 |
| TOTAL HOURS PER DAY | 24.0 | 24.0 |

# CHARACTERISTICS OF PATIENT ENCOUNTERS

(DERIVED FROM PART II-C OF THE SURVEY INSTRUMENT)

ALL DATA ARE PERCENTAGES UNLESS OTHERWISE INDICATED

| CHARACTERISTICS | (1) YOUR PRACTICE | (2) AVERAGE FOR ALL PHYSICIANS STUDIED |
|---|---|---|
| LOCATION OF ENCOUNTERS | | |
| OFFICE/OPD | 0.0 | 19.5 |
| OUTPATIENT DIALYSIS | 26.7 | 39.4 |
| INPATIENT DIALYSIS | 6.7 | 5.5 |
| HOSPITAL | 63.3 | 34.0 |
| OTHER | 3.3 | 0.8 |
| NOT SPECIFIED | 0.0 | 0.7 |
| MEAN PATIENT AGE | 58.2 | 54.0 |
| PATIENT SEX | | |
| MALE | 50.0 | 49.5 |
| FEMALE | 50.0 | 48.5 |
| NOT SPECIFIED | 0.0 | 2.0 |
| PATIENT SOURCE | | |
| SELF/PATIENT | 3.3 | 37.3 |
| AGENCY | 0.0 | 1.1 |
| PHYSICIAN | 53.3 | 46.8 |
| CONSULT | 43.3 | 12.3 |
| NOT SPECIFIED | 0.0 | 2.6 |
| SEEN PATIENT BEFORE | | |
| YES | 96.7 | 91.0 |
| NO | 3.3 | 7.0 |
| NOT SPECIFIED | 0.0 | 2.0 |
| REGULAR PATIENT | | |
| YES | 66.7 | 78.4 |
| NO | 33.3 | 19.4 |
| NOT SPECIFIED | 0.0 | 2.2 |
| MAJORITY OF CARE | | |
| YES | 80.0 | 74.7 |
| NO | 20.0 | 19.2 |
| UNDETERMINED | 0.0 | 3.5 |
| NOT SPECIFIED | 0.0 | 2.6 |
| RACE OR ETHNICITY | | |
| WHITE (NON-HISPANIC) | 6.7 | 64.2 |
| BLACK (NON-HISPANIC) | 90.0 | 24.9 |
| HISPANIC | 0.0 | 6.2 |
| ASIAN OR PACIFIC ISLANDER | 0.0 | 1.8 |
| AMER INDIAN, ALASKAN NATIVE | 3.3 | 0.4 |
| NOT SPECIFIED | 0.0 | 2.6 |

## CHARACTERISTICS OF PATIENT ENCOUNTERS (CONTINUED)

| CHARACTERISTICS | (1) YOUR PRACTICE | (2) AVERAGE FOR ALL PHYSICIANS STUDIED |
|---|---|---|
| CHRONICITY OF PROBLEM | | |
| NONE | 3.3 | 11.8 |
| ACUTE | 40.0 | 23.1 |
| CHRONIC | 56.7 | 53.5 |
| NOT SPECIFIED | 0.0 | 6.6 |
| SEVERITY OF PROBLEM | | |
| NONE | 3.3 | 11.8 |
| MINOR | 13.3 | 22.2 |
| MODERATE | 70.0 | 40.3 |
| SEVERE | 13.3 | 19.1 |
| NOT SPECIFIED | 0.0 | 6.6 |
| URGENCY OF PROBLEM | | |
| NONE | 16.7 | 15.1 |
| MODERATE | 83.3 | 75.7 |
| EMERGENCY | 0.0 | 2.4 |
| NOT SPECIFIED | 0.0 | 6.8 |
| COMPLEXITY OF SERVICE | | |
| MINIMAL | 21.4 | 16.8 |
| BRIEF | 10.7 | 23.9 |
| LIMITED | 57.1 | 32.0 |
| EXTENDED | 0.0 | 14.1 |
| COMPREHENSIVE | 10.7 | 6.7 |
| NOT SPECIFIED | 0.0 | 6.5 |
| YOUR NEXT CONTACT | | |
| NONE | 0.0 | 2.7 |
| TELEPHONE | 0.0 | 1.1 |
| RETURN AS NECESSARY | 0.0 | 2.3 |
| VISIT SCHEDULED | 3.3 | 21.3 |
| OTHER | 96.7 | 66.4 |
| NOT SPECIFIED | 0.0 | 6.2 |
| REFERRAL/CONSULTATION | | |
| NONE | 93.3 | 81.9 |
| MEDICAL SPECIALIST | 3.3 | 3.2 |
| SURGICAL SPECIALIST | 3.3 | 4.5 |
| OTHER | 0.0 | 3.2 |
| NOT SPECIFIED | 0.0 | 7.2 |

# PERCENTAGE OF PATIENTS WITH DIAGNOSTIC PROCEDURES RANK ORDERED FOR ENTIRE SPECIALTY

(DERIVED FROM PART II-C OF THE SURVEY INSTRUMENT)

| PROCEDURE | (1) YOUR PRACTICE | (2) AVERAGE FOR ALL PHYSICIANS STUDIED |
|---|---|---|
| NONE | 46.7 | 38.6 |
| BLOOD CHEMISTRY | 10.0 | 27.0 |
| ROUTINE LAB: CBC, URINALYSIS | 10.0 | 25.0 |
| "PANEL" - AUTOMATED | 6.7 | 17.8 |
| CHEST X-RAY | 3.3 | 8.1 |
| ECG | 3.3 | 6.0 |
| DOCTOR EXAM OF URINE | 0.0 | 4.8 |
| CULTURE | 16.7 | 4.2 |
| TESTS - OTHER | 6.7 | 3.6 |
| ARTERIAL PUNCTURE | 3.3 | 2.4 |
| CREATININE CLEARANCE | 0.0 | 2.4 |
| RADIOLOGY - OTHER | 0.0 | 2.1 |
| RENAL FUNCTION - OTHER | 3.3 | 2.0 |
| IMMUNOLOGIC TEST | 3.3 | 1.7 |
| ULTRASOUND | 0.0 | 1.5 |
| QUANTITATIVE URINE PROTEIN | 0.0 | 1.5 |
| ENZYMES | 0.0 | 1.2 |
| GI X-RAY | 3.3 | 1.0 |
| RADIOISOTOPIC IMAGING | 0.0 | 1.0 |
| CAT SCAN | 0.0 | 0.9 |
| LIVER FUNCTION | 6.7 | 0.7 |
| HORMONAL ASSAYS | 0.0 | 0.7 |
| SEROLOGY/VD | 0.0 | 0.6 |
| INTRAVENOUS UROGRAPHY | 0.0 | 0.6 |
| THYROID FUNCTION | 3.3 | 0.5 |
| ARTERIOGRAPHY/VENOGRAPHY | 3.3 | 0.5 |
| BREAST EXAM | 0.0 | 0.4 |
| BONE SURVEY | 0.0 | 0.4 |
| PAP SMEAR | 0.0 | 0.4 |
| PULMONARY FUNCTION | 0.0 | 0.4 |
| BIOPSY - RENAL | 0.0 | 0.3 |
| EEG | 0.0 | 0.3 |
| ENDOSCOPY | 0.0 | 0.2 |
| CYSTOGRAM | 0.0 | 0.2 |
| LIPID SCREEN | 0.0 | 0.2 |
| CATHETERIZATION - OTHER | 0.0 | 0.2 |
| RENAL CONCENTRATION TEST | 0.0 | 0.2 |
| BIOPSY - OTHER | 3.3 | 0.2 |
| NERVE CONDUCTION/EMG | 0.0 | 0.1 |
| CYSTOSCOPY | 0.0 | 0.1 |
| GLUCOSE TOLERANCE | 0.0 | 0.1 |
| RETROGRADE UROGRAPHY | 0.0 | 0.1 |
| NEEDLE ASPIRATION | 0.0 | 0.1 |
| LUMBAR PUNCTURE | 0.0 | 0.1 |
| RENAL VEIN CATHETERIZATION | 0.0 | 0.1 |
| SKIN TEST | 0.0 | 0.1 |
| BONE MARROW | 0.0 | 0.1 |
| AUDIOMETRY | 0.0 | 0.1 |

# PERCENTAGE OF PATIENTS WITH THERAPEUTIC PROCEDURES RANK ORDERED FOR ENTIRE SPECIALTY

(DERIVED FROM PART II-C OF THE SURVEY INSTRUMENT)

| PROCEDURE/TREATMENT | (1) YOUR PRACTICE | (2) AVER FOR PHYS STUD |
|---|---|---|
| NONE | 26.7 | 29. |
| INTRAVENOUS FLUIDS | 6.7 | 9. |
| RX - OTHER | 3.3 | 8. |
| TRANSFUSION | 0.0 | 2. |
| STEROIDS/IMMUNOSUPPRESSIVE THERAPY | 0.0 | 1. |
| VASCULAR CATHETERIZATION, FOR DIALYS | 0.0 | 1. |
| INJECTIONS - OTHER | 0.0 | 1. |
| PHYSICAL REHABILITATION | 0.0 | 0. |
| ACCESS DEVICE SURGERY | 6.7 | 0. |
| TUBING CHANGE | 0.0 | 0. |
| DRESSING: APPLY/REMOVE | 0.0 | 0. |
| IMMUNIZATIONS | 0.0 | 0. |
| PERITONEAL CATHETERIZATION | 0.0 | 0. |
| URINARY CATHETERIZATION | 0.0 | 0. |
| CHEMOTHERAPY | 0.0 | 0. |
| SURGERY - OTHER | 0.0 | 0. |
| VASCULAR CATHETERIZATION, NON-NEPHRO | 0.0 | 0. |
| INCISION/DRAINAGE | 0.0 | 0. |
| SHUNT DECLOTTING | 0.0 | 0. |
| MINOR TISSUE REMOVAL | 0.0 | 0. |
| DEBRIDEMENT | 0.0 | 0. |
| RENAL TRANSPLANT | 0.0 | 0. |
| SUTURE REMOVAL | 0.0 | 0. |
| MECH RELIEF URINARY OBSTRUCTION | 0.0 | 0. |
| RADIATION THERAPY | 0.0 | 0. |
| PARACENTESIS | 0.0 | 0. |
| ANESTHETIZATION | 0.0 | 0. |
| FOREIGN BODY REMOVAL | 0.0 | 0. |
| SUTURING ONLY | 0.0 | 0. |
| DILATATION/CURETTAGE | 0.0 | 0. |
| ARTHROCENTESIS | 0.0 | 0. |
| CAUTERIZATION/CRYOTHERAPY | 0.0 | 0. |
| CONTRACEPTIVES, INCL. IUD | 0.0 | 0. |
| COUNSELING: | | |
| FAMILY/SOCIAL/SEXUAL | 6.7 | 3. |
| PATIENT DIALYSIS TRAINING | 0.0 | 1. |
| PATIENT EDUCATION | 3.3 | 10. |
| THERAPEUTIC LISTENING/REASSURANCE | 20.0 | 13. |
| PSYCHOTHERAPY | 0.0 | 0.6 |
| PRESCRIPTIONS: | | |
| DRUGS - SYSTEMIC | 16.7 | 33.9 |
| DRUGS - TOPICAL | 3.3 | 0.9 |
| EXERCISE/ACTIVITY | 0.0 | 3.2 |
| DIET | 26.7 | 8.8 |
| PROSTHESIS/AIDS | 3.3 | 0.3 |

## PERCENTAGE OF PATIENTS WITH LEADING RENAL DISEASE ETIOLOGY

(DERIVED FROM PART II-C OF THE SURVEY INSTRUMENT)

| ETIOLOGY | (1) YOUR PRACTICE | (2) AVERAGE FOR ALL PHYSICIANS STUDIED |
|---|---|---|
| NONE | 0.0 | 17.5 |
| PRIMARY HYPERTENSIVE DISEASE | 36.7 | 19.6 |
| GLOMERULONEPHRITIS | 6.7 | 15.8 |
| DIABETIC NEPHROPATHY | 10.0 | 12.7 |
| OTHER OR UNKNOWN ETIOLOGY | 16.7 | 11.3 |
| OTHER INTERSTITIAL NEPHRITIS | 6.7 | 4.8 |
| POLYCYSTIC KIDNEY DISEASE | 10.0 | 4.2 |
| OBSTRUCTIVE UROPATHY, ACQUIRED | 10.0 | 2.4 |
| COLLAGEN VASCULAR DISEASE | 0.0 | 2.3 |
| ANALGESIC ABUSE NEPHROPATHY | 3.3 | 0.9 |
| OBSTRUCTIVE UROPATHY, CONGENITAL | 0.0 | 0.8 |
| HEREDITARY INTERSTITIAL NEPHRITIS | 0.0 | 0.6 |
| MULTIPLE MYELOMA | 0.0 | 0.5 |
| GOUTY NEPHROPATHY | 0.0 | 0.3 |
| AMYLOIDOSIS | 0.0 | 0.3 |
| NOT SPECIFIED | 0.0 | 6.0 |

## PERCENTAGE OF PATIENTS WITH LEADING RENAL DIALYSIS

(DERIVED FROM PART II-C OF THE SURVEY INSTRUMENT)

| DIALYSIS MODALITY | (1) YOUR PRACTICE | (2) AVERAGE FOR ALL PHYSICIAN STUDIED |
|---|---|---|
| NONE | 33.3 | 35.3 |
| FREESTANDING FACILITY HEMODIALYSIS | 0.0 | 27.1 |
| HOSPITAL BASED CENTER HEMODIALYSIS | 30.0 | 21.4 |
| ACUTE RENAL FAILURE | 10.0 | 4.3 |
| CAPD | 6.7 | 2.6 |
| IPD | 20.0 | 1.5 |
| HOME HEMODIALYSIS | 0.0 | 1.0 |
| CCPD | 0.0 | 0.4 |
| NOT SPECIFIED | 0.0 | 6.3 |

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